SEP 28 1949

PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

# Atomic Scientists

AUGUST-SEPTEMBER, 1949 50c

JULIAN HUXLEY:
Freedom for Science: an Appeal for Action

BART J. BOK:
Freedom of Science and the Declaration of Human Rights

FREDERICK H. OSBORN:
The Control of Atomic Energy

ANNE W. MARKS: Washington Notes

FRANCIS W. CARPENTER: UNAEC News

THE GREAT INQUIRY

Testimony at AEC Hearings

Mr. Lilienthal
Sen. Hickenlooper
Dr. DuBridge
Dr. Fermi
Dr. Bacher
Mr. Parker
Dr. Bradbury
Dr. Zinn

Vol. V Chicago, Illinois Nos. 8-9

# THE ATOMIC SCIENTISTS

WHO STARTED the first nuclear chain reaction in Chicago on December 2, 1942, did not simultaneously discover a ready-made solution for the problems of atomic energy.

THEY WERE, however, the first to perceive the dynamic role which atomic energy was to play in world affairs.

AS CITIZENS they believed in enlightened public opinion as the basis of democracy.

AS SCIENTISTS they recognized the importance of accurate information as a basis for the development of constructive public policy.

OUT OF THEIR EARLY KNOWLEDGE of atomic energy and their concern for public understanding came . . .

# THE BULLETIN OF THE ATOMIC SCIENTISTS

A monthly journal now universally recognized as the principal source and established forum of contemporary discussion on atomic energy.

**The Bulletin has brought the following articles to its readers:**

**Walter Isard and Vincent Whitney**
The Development of Atomic Power

**David F. Cavers**
Atomic Power versus World Security

**J. Robert Oppenheimer**
The International Control of Atomic Energy

**Jacques Maritain**
The Scientist and the Community

**David E. Lilienthal**
Public Employment or Public Pillory

**Bernard Brodie**
Navy Department Thinking on the Atomic Bomb

**Freedom Demands Responsibility**
A Symposium: C. Daniel, A. M. Squires, Eric Ashby, A. P. Lerner. A. D. Ritchie, H. C. Urey, M. von Laue, N. Wiener, H. S. W. Massey, Jacques Maritain

**L. Kowarski**
Atomic Energy Developments in France

**Soviet Statements on Atomic Energy and U. S. Answers**

**Tracy B. Augur**
The Dispersal of Cities as a Defense Measure

**Bart J. Bok, Francis Friedman, and Victor Weisskopf**
Security Regulations in Nuclear Research

**Brien McMahon**
Should We Reveal the Size of Our Stockpile?

**J. H. Manley**
The Los Alamos Scientific Laboratory

**The Russian Purge of Genetics**
History of the Conflict, with Commentaries by Sewall Wright, L. C. Dunn, Karl Sax, T. Dobzhansky

1126 E. 59th St., Chicago 37, Illinois

**Yearly Subscription $3.50**

# Bulletin of the Atomic Scientists

Vol. V August-September, 1949 Nos. 8-9



**Editors**

H. H. Goldsmith

Eugene Rabinowitch

Assistant Editor
Mrs. Alan Simpson

Art by Martyl

**Board of Directors**

Kenneth S. Cole
T. H. Davies
H. H. Goldsmith
Samuel Goudsmit
C. A. Hutchison, Jr.
E. Rabinowitch
Edward A. Shils
John Simpson

**Board of Sponsors**

J. Robert Oppenheimer, Chairman

Harold C. Urey, Vice-Chairman

H. A. Bethe
P. W. Bridgman
Detlev W. Bronk
A. H. Compton
E. U. Condon
F. Daniels
L. A. DuBridge
Albert Einstein
James Franck
S. A. Goudsmit
T. R. Hogness
F. W. Loomis
Philip M. Morse
H. J. Muller
Linus Pauling
G. B. Pegram
I. I. Rabi
Julian Schwinger
Cyril S. Smith
Leo Szilard
Edward Teller
V. F. Weisskopf
Sewall Wright
J. R. Zacharias



Published monthly by the Educational Foundation for Nuclear Science, Inc., 956 E. 58th Street, Chicago 37. Phone: MIdway 3-3056. Manuscripts should be sent in triplicate to Mrs. Alan Simpson at the above address.

Subscription—$3.50 a year. Single copy —35 cents. Four weeks notice is required for change of address; both old and new addresses must be given.



**WILEY**

## ELEMENTARY PILE THEORY

By Harry Soodak and Edward C. Campbell

The first elementary book to investigate in detail what happens to the fast neutrons given off in the act of fission, how they move in space, and how they are slowed down in matter. Only simple mathematics is used.

December, 1949 — Approx. 76 pages — Prob. Price $2.50

## INTRODUCTION TO RADIOCHEMISTRY

By Gerhart Friedlander and Joseph W. Kennedy

The basic facts of nuclear physics are reviewed in the first section. Later chapters discuss types of radioactive disintegration, detection of radiation, the statistical treatment of radioactivity data, and the applications of radioactivity to chemistry.

1949 — 412 pages — $5.00

## ISOTOPIC CARBON

By Melvin Calvin, Charles Heidelberger, James C. Reid, Bert M. Tolbert, and Peter E. Yankwich

The only book to supply complete information on the measurement of carbon isotopes and procedures for manipulating them. Contains all tracer applications published up to July, 1948 and all syntheses up to April, 1948.

1949 — 376 pages — $5.50

## RADIOACTIVE MEASUREMENTS WITH NUCLEAR EMULSIONS

By Herman Yagoda

Contains practical methods by which photographic emulsions can be used to measure radioactivity, plus a careful explanation of the theory involved.

1949 — 356 pages — $5.00

## THE STRUCTURE OF MATTER

By Francis Owen Rice and Edward Teller

One of the Wiley STRUCTURE OF MATTER SERIES, Maria Goeppert Mayer, Advisory Editor

Contains an outline of the various properties of matter and provides a guide to their systematic interpretation by quantum mechanics.

1949 — 362 pages — $5.00

## ATOMIC ENERGY

By Karl K. Darrow

By using analogies and illustrations to explain the difficult concepts, Dr. Darrow gives markedly simple, yet scientifically accurate, summary of the basic facts of nuclear physics.

1948 — 80 pages — $2.00

## FOUNDATIONS OF MODERN PHYSICS

By Thomas B. Brown

Second Edition

Makes modern physics understandable by describing and explaining the experiments and discoveries by which the fundamental concepts of the science have been established.

1949 — 391 pages — $5.00

On-approval copies of any of these books may be obtained by writing direct to the publisher.

**JOHN WILEY & SONS, Inc.**

440-4th Ave., New York 16, N.Y.

# HYMAN H. GOLDSMITH

HYMAN H. GOLDSMITH, the initiator of the *Bulletin of the Atomic Scientists* and its co-editor, died on August 7, 1949, at South Wyndham, Vermont, as the result of an accident. The last four years of his life had been consecrated, with a relentless and impatient devotion, to the causes which the *Bulletin* has served. In the spring and summer of 1945 he had taken a passionate interest in the long, anxious discussions of American atomic energy policy within the Metallurgy Project at the University of Chicago.

After Hiroshima, when the bomb's existence became public knowledge, Goldsmith was one of a relatively large group of atomic energy scientists who thought it their first duty to guide American policy into the channels of realistic wisdom and enlightened humanity. These were days of public meetings and conferences with civic and political leaders, and scientists who spoke with diplomatic calm and lucidity were required. Goldsmith did not play a great public role in these activities: but he was a conscience-driven incendiary whose explosive scorn for indifference and pusillanimity was made acceptable and effective within the circles of scientists themselves by his obviously and profoundly disinterested concern for the common good.

All his life he was a disrespecter of routines and conventional expectations and restraints. When the situation called for the *Bulletin* to be created, he acted simply on his conviction of that necessity. To say that the *Bulletin* was founded on a shoestring would be to describe it as overdressed at birth. It lived for many months from hand to mouth, supported by the Atomic Scientists of Chicago, debts, and Goldsmith's convictions.

He chose to make his contribution to the growth of a sense of moral responsibility and political insight among American scientists through a never-resting activity on behalf of the *Bulletin of the Atomic Scientists*. He loved the *Bulletin* as a jealous parent. He believed it to be the best and most important journal in the world. He had the interests of the *Bulletin* on his mind wherever his manifold professional duties took him, and everywhere else as well. His vast acquaintanceship, not only among scientists, but also among philosophers, musicians, and writers—he was "Hy" to thousands from Berkeley to Brookhaven and from the Village to the Left Bank—and his wide intellectual curiosity and sensitive taste brought him into contact with men of various types and backgrounds. In every situation his first question was "How can this person or this article or this book be of use to the *Bulletin?*" Financial support for the *Bulletin;* a good word on behalf of the *Bulletin;* an article for the *Bulletin*—friends in America and Europe will recall how he pursued and buttonholed them for these, with a fervor which was difficult to refuse.

The *Bulletin* has always been a creation of conscience. It has never been the product of professionals who could devote all their time to it, and there have been many occasions when political frustrations, financial stringency, and the pressing demands of research and teaching have slackened the will to continue.

Goldsmith, by his own example and his angry unwillingness to understand that any reason, however good, could be good enough to justify pessimism about the *Bulletin's* future, or reduction of one's efforts on its behalf, has carried the *Bulletin* through all these crises. He was always on the rush, catching a train or a plane, or hurrying to a scientific meeting; but with a taxicab hooting impatiently at the door, he kept arguing, producing last-minute suggestions for financing, plans for new articles, or improvements in format. No exhaustion was too deep and no night too long for him to stop discussing, with quick understanding and sharp judgment, the fundamental problems of science and politics, or developing plans for the future of the *Bulletin*.

As co-editor he never wrote an editorial or article for the *Bulletin*, but he was a scrupulously vigilant and often acidly sharp critic of whatever the other members of the Board wrote. The gadfly's stings came where they were needed. His years of random literary and historical reading at the New York Public Library had given him a feeling for the quality of style and orderliness of presentation which made him a most valuable influence, and his mark, in one way or another, was on everything which went into the *Bulletin*.

Remarkably, the man whose temper so often ran away with him in conversation, who had little tolerance for those who disagreed with him and little indulgence for human weaknesses, was an influence for moderation and balance both in style and in opinion when it came to the contents of the *Bulletin*. He was anxious to see all points of view presented fairly and adequately. He abhorred emotional appeals, pathos, sentimentalism, and pious rectitude. His eye was unerring in discovering catchwords, exaggerations, or empty phraseology. He had respect only for terse, logical presentation, and fair, well-balanced judgment.

We do not know whether Hy Goldsmith was a happy man when he died, and we do not know whether he thought that his life was being filled with accomplishment. Despite his acquaintance with philosophy and philosophers, he was not one to balance his personal accounts. He was too absorbed in the press of events; too open to the suggestion of future possibilities; too braced for maneuver; too anxious to get the job done, to worry about where he himself stood.

To renew in their memories the image of this restless, devoted man and to keep his example before the minds of those who concern themselves with the relations between science, politics, morality, and welfare, the Board of the *Bulletin* has decided to create a Hyman Goldsmith Memorial Award to be given annually for the best article, book, or public pronouncement which contributes to the clarification and establishment of the right relations between science and politics. Details of this award will be announced later.

Editorial

# HOW NOT TO INVESTIGATE THE ATOMIC ENERGY COMMISSION

IN OUR last issue, we postponed judgment on Senator Hickenlooper's investigation of the AEC until the conclusion of the hearings. They are now substantially completed. Some topics remain to be treated in executive session, mainly a dozen or so individual clearance cases. The Senator from Iowa has repeatedly professed his complete ignorance of technical matters, and has declined himself ready to accept the judgment of experts that the AEC is progressing. And, as to the accusation that clearances for secret work have been granted to individuals of questionable loyalty, if Senator Hickenlooper's "Exhibit A"—the only one he had occasion to disclose in public—is typical, we can expect these accusations to be based on nothing but vague suspicions and irresponsible denunciations.

Hence a judgment on Senator Hickenlooper's one-man crusade against Mr. Lilienthal can, in all fairness, now be rendered. In our opinion, it must be declared a painful failure. If ridiculous behavior were fatal in politics, Senator Hickenlooper's political career would be finished. The Republication leadership should select another man to represent them in the Joint Atomic Energy Committee.

Senator Hickenlooper announced grandiloquently that he was going to prove "incredible mismanagement" on the part of Mr. Lilienthal, administrative failure serious enough to threaten America's world leadership in atomic energy. He diminished his accusation early in the proceedings, when he admitted that the *technical aspects* of the program—weaponeering, production of nuclear explosives, and research—are progressing well. He failed even to claim, much less to produce any evidence, that the security matters were handled by the AEC so badly that losses caused by this laxity outweighed the AEC's positive achievements. What remained then, were charges of occasional bad judgment, excessive expenditure, or unsatisfactory accountability—peripheral stabs aimed far from the heart of the gigantic enterprise administered by Mr. Lilienthal and his Commission.

In his opening onslaught, Senator Hickenlooper merely demonstrated that a governmental agency such as the AEC has difficulty in attracting and keeping top-grade scientific and managerial talent—because of the limitations it puts on scientific freedom and on salaries. None of the top employees whose resignation the Senator attributed to Lilienthal's maladministration, came to the Senator's support; even Dr. Wende, the pile specialist from Hanford, whom Senator Hickenlooper pursued across the country, would not repeat his grievances before the Committee. The total figures of personnel turnover, by which Senator Hickenlooper sought to damn the administration of the AEC turned out, after proper corrections, to be about the same as in government service as a whole, and lower than in private manufacturing industries.

* * *

In his second assault, Senator Hickenlooper attacked the numerous emergency clearances granted by the AEC. He might have had enough of a point there to impress security-minded legislators and commentators; but he had the bad luck to single out for attack the emergency clearances for the Eniwetok tests. When it became clear that in these clearances, the Atomic Energy Commission had the full support of the Military, Senator Hickenlooper denied having ever mentioned the Eniwetok clearances at all, only to have the transcript of his earlier statements read back to him by an uncharitable colleague.

* * *

Then came the two thunder-and-lightning shows for the press headlines; The "hottest" AEC report—so hot that it had to be carried to the Capitol by a gun-toting guard—written by a "suspect"! Precious Uranium 235 lost—presumably stolen by spies—at the Argonne National Laboratory!

The case of Mr. A, the compiler of the "hot" document, was discussed in public just long enough to show that it was one of the now common cases of unsupportable denunciations. The man was cleared for his job by a full FBI investigation; he was re-investigated by an AEC Board after new "derogatory information" was produced, and fully vindicated. Mr. Lilienthal was given a good cue for a sermon on the protection of the individual against unwarranted defamation, and on the difference between accusation and evidence.

* * *

Senator Hickenlooper got into an even less enviable position in the affair of the lost uranium. Those who will take the time to read the condensation of Dr. Zinn's and Dr. Thiele's testimony in this issue, will find it a good detective story, with Senator Hickenlooper cast in the familiar role of the police sergeant whose plodding stubborness brings into proper relief the brilliance of the scientific amateur detective. In addition, Mr. Hickenlooper had been careless enough to reveal, in his opening blast to the press, the degree of enrichment of the lost uranium—a "classified" piece of information.

After the testimonies of the two scientific witnesses had reduced to ridicule the dark suspicions which Senator Hickenlooper has tried to maintain to the last, a much more real question of breaches of security was raised by Representative Price, who questioned the sources of some information which had

## In This Issue


Hyman H. Goldsmith ..... 206

How Not To Investigate the Atomic Energy Commission ..... 207

Freedom For Science: An Appeal For Action
Julian Huxley ..... 209

General Advisory Committee's Statement on Fellowships ..... 210

Freedom of Science and the Universal Declaration of Human Rights
Bart J. Bok ..... 211

Washington Notes
Anne Wilson Marks ..... 218

The Great Inquiry: Testimony at AEC Hearings ..... 221

Control of Atomic Energy: An International Problem
Frederick H. Osborn ..... 251

United Nations Atomic Energy News
Francis W. Carpenter ..... 255



The present issue constitutes a double number—Volume V, Nos. 8 and 9.

served as background for Senator Hickenlooper's campaign against the AEC. He quoted a magazine article which combined vehement attacks on Mr. Lilienthal with revelation of such highly classified information as the American bomb stockpile and the effectiveness of Eniwetok bomb models. Ever since the hullaballoo about the unreliability of civilians, in particular, of scientists, as guardians of atomic energy, was first raised in 1945, leaks of classified information—whether authentic or not is beside the point—have come from the most vociferous defenders of the Great Secret.

We do not presume to render judgment in the case of Natural Gas *vs.* Coal as fuel at Oak Ridge. The AEC disregarded the unanimous recommendation of the Joint Committee to desist from the pipe line construction, and the irate Committee has initiated legislation to make it impossible for the AEC to start major construction projects without previous approval by the Joint Committee. The argument that without such a provision, the Committee cannot properly discharge its duties as the supervisor of the greatest national enterprise, has a certain plausibility; on the other hand, the Committee's worry about the reduction in the employment of coal miners which would come about as a result of the AEC decision causes us to be suspicious of trade-union—and mine-owner and railroad—pressure. We should at least be wary.

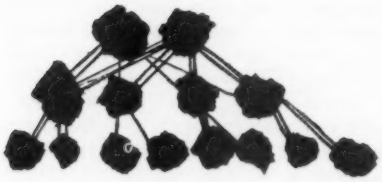
SENATOR Hickenlooper spent almost one-third of the 23 hearings on various cases of excessive expenditure by the town management at Oak Ridge, Los Alamos, and Hanford, in particular on complaints of monopolistic activities of the General Electric at Hanford, Zia Company at Los Alamos, and Roane and Anderson at Oak Ridge. It was anomalous to hear him and Senator Millikin—two staunch supporters of private enterprise, who are always highly suspicious of the socialistic planning tendencies of Mr. Lilienthal and his friends—suggest that the Commission should save money by getting rid of private contractors and operating the towns directly, as the Military did under General Groves. Senator Hickenlooper's Philippics fizzled out with the costliness of the Oak Ridge High School (which is to be twice as expensive per square foot as other Tennessee high schools). As an afterthought, and without preparation, he threw in some figures showing the uncertainty of estimates and the growing costs of the major reactors and AEC laboratories under construction, and read a few crank letters from his mail on this subject. He promised to pass on to the Commission's staff long files of complaints he has collected —apparently dealing with subjects such as the woes of plumbers at Hanford, the grievances of householders in Oak Ridge who are not allowed to repair their own houses, and similar grave subjects. And then he rested his case.

We do not know what the majority and minority reports of the Joint Committee will be after all these acrimonious accusations. But what we know for sure, is that Senator Hickenlooper has shown how *not* to investigate the Atomic Energy Commission. The whole incident illuminates a grave problem facing Congress and the American democracy. With Atomic Energy a national enterprise, with the National Science Foundation in the offing as a major source of funds for scientific research in this country, with the nation's military planning and much of its foreign policy dominated by scientific and technological considerations, and with much of the activity of the AEC bound in secrecy, how can a Congress composed almost exclusively of lawyers and businessmen, with little or no background in science or technology, effectively set and supervise the execution of the national policy? How can it avoid giving blank checks, and then snapping at the fringes of the enormous development it has sanctioned? How can it acquire understanding of, and thus a real voice in the solution of, major problems, such as the determination of the number, and estimation of the military effectiveness of atomic weapons, the soundness of the nuclear reactor program (which will cost the nation tens of billions before any economically useful power is produced), or the plans for protection against atomic warfare—to take examples only from the field of atomic energy?

Advocacy of government by scientists is not implied by the proposition that the present state of affairs is unsatisfactory. The time-budget of our legislators, dominated as they are by local preoccupations, is far too crowded for them to acquire the knowledge necessary to understand the technical aspects of the subjects for which they have assumed responsibility. Senator Hickenlooper, former Chairman of the Joint Committee on Atomic Energy, has proclaimed on several occasions, that he does not understand, and obviously does not think it his duty to understand, anything of the technical aspect of the whole enterprise. Many members of Congress are overawed by, or instinctively distrustful of, scientists or technical people. They cannot understand what the scientists say, and do not want to take what they are saying for granted. (The debate on the meaning of "atomic energy" in the discussion of the isotope export program, briefly reported on p. 226 of this issue, provides a good example of the amusing but nonetheless significant, situations arising from this misunderstanding and distrust.)

IF THE democratic system of government is not to become a mere shell, through the incapacity of the legislators to understand some of the most important things about which they legislate, some changes are needed. In the first place, the legislators must be provided with really competent advisors, whose integrity, independence, and competence they trust. It will also be necessary for the AEC to take the responsible members of the Committee more intimately into its confidence than it seems to have done, so that the Committee will not suffer from the sense of bafflement which only aggravates the elements of pettiness and pique which are so often present in our political life. Beyond this, major political parties, or at least their congressional representatives, could perhaps give consideration to introducing some representation of scientists and technologists into their inner councils, and even into Congress (if a constituency can be found willing to have such an unorthodox representation, and if scientists are capable of that degree of public spirit and political ambition.) A few competent scientists and engineers, scattered over the benches of the majority and of the opposition, might enable committees dealing with scientific and technical matters to lift future investigations of the AEC—and the AEC should be probed by Congress often and deeply—to a much higher level than Senator Hickenlooper has achieved.

# FREEDOM FOR SCIENCE: AN APPEAL FOR ACTION



*Julian Huxley*

In the June 25 issue of NATURE, Mr. Huxley, distinguished British biologist and the former Director-General of UNESCO, discusses once again the problems arising from the attempt to establish an exclusive government-approved school of biology in the Soviet Union, a development which has been treated extensively in the May issue of the BULLETIN. Mr. Huxley concludes his article with an appeal for positive action on the part of scientists in Western democratic countries to halt the misunderstanding and perversion of science, not only by the Soviet Government, but, in less flagrant fashion, by the Western governments as well. We believe that individual scientists and scientists' societies in this country must seriously consider Mr. Huxley's ideas and hope that this presentation will help to initiate a discussion of his proposals.

HOW should men of science act in the face of the increasing concern of the State with science, and the consequent increasing pressure of the State on science?

Can they accept the existence of an official scientific policy? Can they accept the possibility that the majority of men of science shall be paid by the State and that the major cost of scientific work shall be borne on government funds? Can they accept official direction as to what subjects shall be investigated?

I think that they can (indeed, that they must)—but with certain clearly formulated provisos. A Government is at perfect liberty to embark on a large-scale and comprehensive official scientific policy. It can legitimately decide that that policy shall be predominantly practical—designed to raise the standard of life, to improve health, to increase production, or to promote military efficiency. It can legitimately demand that the scientific curriculum throughout all stages of education should be adequate and should be framed so as to give the best possible understanding of Nature and man's place in Nature, of the social functions of science and of its intellectual and practical importance. It can legitimately insist on large-scale educational campaigns outside the school and university system to help the general population to understand the value and importance of science as a whole or of this or that branch of scientific work, or to make them feel that they are actively and intelligently participating in the nation's scientific effort. It can legitimately do everything in its power to check superstition, to combat unscientific or anti-scientific attitudes of mind, and to promote an understanding of scientific method, and of its value and importance.

Probably all men of science would agree that it is legitimate, and most of them that it is desirable, for a Government to embark on such a policy. But they would assuredly only agree on certain conditions. In the first place, they would say a Government[1] has no right to pronounce in any way on the truth or falsity of any scientific facts, laws, or theories, nor to exert pressure in favor of their acceptance or rejection by scientists. It must not subordinate the intellectual autonomy of science to any other criteria, whether religious, philosophical, or political, nor seek to impose upon scientific truth standards other than its own, nor relate scientific activity to any orthodoxy or authoritarian principle, nor, most of all, impose a scientific orthodoxy.

As implication of this, it must consult scientific opinion in forming its scientific policy, and leave all essentially scientific decisions in the hands of men of science. On the educational side of its scientific policy, it must, of course, consult educationists as well as scientists, and recognize their autonomy in their own sphere.

It must recognize the special characteristics of science and the scientific method—the fact that it is essentially a universal activity; that for its advance it depends very largely on freedom of publication, which, in its turn, implies freedom for other scientific workers to test and re-test published conclusions; that major advances in scientific knowledge cannot be planned to order, and that new possibilities of practical advance often derive from the most unexpected quarters, including investigations undertaken with no practical aim.

As a consequence of these characteristics of science, the State should permit the utmost freedom of publication consonant with military security; it should encourage the international exchange of publications and research workers to the fullest extent; and it should not insist on all research, even all research paid for out of government funds, being directed to immediate practical objectives, but should leave a considerable "unplanned sector" of fundamental research to the free choice of the pure scientist.

In education, while not in any way minimizing the importance of science as an organized body of tested knowledge, it should also recognize the value of the scientific method—of free inquiry and free discussion, with reference back to fact where possible, as against dogmatic assertion and unreflective assimilation.

Meanwhile, I would suggest that scientific workers in general, and biologists in particular, have a responsibility in seeing that the great generalizations of modern genetics and evolutionary biology, which have so many important implications in so many fields, should be admitted as an indispensable part of general education.

IN GENERAL, the State must recognize that science has an autonomous aspect. In the first place, it is a quest for knowledge and understanding of

Reprinted with the kind permission of the editor of *Nature*.

[1] This applies equally to the political organization in a one-party State (for example, the Communist Party in the U.S.S.R.), which in some respects is supra-governmental.

Nature as well as a means of controlling it, and some of the most valuable discoveries have been made by men completely unconcerned with possible practical importance, and interested only in discovery for its own sake. In the second place, although scientific progress is obviously conditioned by its social and economic environment, it is not wholly determined by them. Granted that scientific activity is maintained at or above a certain level, it has a certain momentum of its own, which will automatically lead to the clarification of fields the exploration of which has begun.[2]

I would suggest that the time is propitious—and also pressing—for men of science all over the world to unite in thinking out these problems, and, in particular, in defining the scope and degree of the autonomy of science in relation to other higher activities of man, to politics, and to the State. The final outcome should, I think, be a public statement, brief yet comprehensive, a profession of scientific faith, and affirmation of the rights and duties of science and of scientists.

In framing this, the leading role should doubtless be taken by the premier national scientific bodies. Thus, in Britain, we might hope that the Royal Society would take the responsibility. It would presumably wish to consult other bodies which have paid special attention to the subject, such as the Society of Freedom in Science, and would doubtless endeavor to secure as much support as the British Association and the Association of Scientific Workers, from regional bodies like the Royal Society of Edinburgh, and from the institutes and societies concerned with particular branches of science, especially those dealing with genetics and evolutionary biology.

To put the matter on an international basis, the International Council of Scientific Unions should be called upon, which would then presumably make contact with its various constituent unions, and with international professional bodies such as the International Federation of Scientific Workers.

A manifesto of this kind, subscribed to by the greatest possible number of scientific organizations and societies, would be a powerful instrument of scientific freedom and an affirmation of the supra-national and universal character of scientific activity.

[2] Dr. J. R. Baker has directed my attention to the fact that the above suggestions are much along the lines of those put forward by the Society for Freedom in Science during the past nine years.

THE converse of this should also be undertaken, namely, the formulation of an international charter for science by the intergovernmental agencies concerned—UNESCO in the lead, but with the co-operation and agreement of the other specialized agencies concerned (notably the Food and Agriculture Organization and the World Health Organization) and of the Economic and Social Council of the United Nations. In this, the governments concerned would guarantee certain rights to science and to scientists, while presumably at the same time defining certain duties expected from them.

The third and quite specific question remains—how to persuade the U.S.S.R., together with any other countries which may be concerned, to reverse its present policy toward science. Clearly nothing can be done here save by way of precept—through an intergovernmentally agreed charter as suggested above; and of persuasion — through a joint approach of the scientific academies of the rest of the world, and perhaps through the International Scientific Unions. In the particular case of genetics, a joint approach might be made by the specialized societies concerned with genetics and evolution, perhaps with the co-operation of the International Genetics Congress and the International Union of Biological Sciences. Any such approaches should lay strong emphasis on the unity and international character of science, as well as on the advantages of scientific freedom and autonomy *vis-à-vis* political or philosophical orthodoxy.

THE actions and the methods of Lysenko and of the Academy of Sciences in supporting him are in my view intellectually and socially deplorable. But if the issues of principle which they have raised are clearly grasped and taken to heart by men of science in general, and the conclusions from them resolutely drawn, the battle of Soviet genetics will not have been fought and lost in vain. For this will mean that over the great majority of the world the scientific movement will for the first time have become fully conscious of itself and of its social functions, of the vital importance, but at the same time the limitations, of scientific method, of the equal importance of a proper degree of scientific autonomy, and of the rights and duties of science in relation to other higher activities of man, to the State, and to human society as a whole.

## AEC Advisory Committee Statement on Fellowships

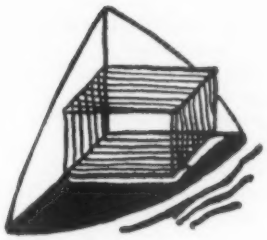
We understand that proposals have been put forward that would require all holders of AEC fellowships to be cleared after an FBI investigation. We should like to register our strong disapproval of any such procedures. Admittedly, the tensions of the times and the secret nature of the atomic energy work require elaborate checks for all who have access to classified material. But to carry over the same security concepts to holders of fellowships who will in no way have access to secret or confidential information seems to us both unwise and unnecessary.

It is clear that these requirements of FBI investigation of prospective holders of AEC fellowships would extend still further the area of federal interference with the private lives of citizens. We use the word "interference" advisedly, for it is evident that the type of questioning of friends, relatives, and acquaintances required by the investigative procedures of the FBI do constitute an encroachment on the private affairs of many people. To repeat, we grant this to be necessary in these times in those cases where persons are to be employed on secret government matters. But we are horrified by the prospects of moving this whole semi-police apparatus into the realm of youth. We believe that the reputation of many young people of the country might be adversely impaired by rumors growing out of such a system of investigation of prospective fellowship-holders. Older people can see in proper perspective calls from FBI agents; they can answer questions about acquaintances without feeling that the man being investigated is under suspicion. But young people of university age are likely to react quite differently. An atmosphere of suspicion and uncertainty is likely to be generated by the activities of federal agents among many groups of friends in colleges, universities, and in local communities. In short, the results of requiring investigations of candidates of fellowships will have serious repercussions throughout the country; it will almost certainly have a serious adverse effect on both the atmosphere of our educational institutions and the outlook of one age group of the entire nation.

Let us admit that without such clearance an occasional clandestine

*(Continued on Page 254)*

# FREEDOM OF SCIENCE AND THE UNIVERSAL DECLARATION OF HUMAN RIGHTS



*Bart J. Bok*

Here an American scientist gives his answer to the question posed by Mr. Huxley in the preceding article: How shall men of science act in the face of increasing state pressure on science? Dr. Bok, Associate Director of the Harvard College Observatory, is Chairman of the National Research Council's Committee on UNESCO. This article was prepared by Dr. Bok for UNESCO and will appear in a more extended form as a pamphlet to be issued in the fall. The editors thank UNESCO for permission to use it in these pages.

SCIENTISTS are citizens and, in common with other people, they like their rights and freedoms. The scientist in his research laboratory desires freedom in the selection of research topics. He wants a minimum of direction and he should be allowed to talk freely about his research work. He should have access to the publications of other workers in the field and he should have the right to publish freely the results of his own investigations. If conditions make it necessary that there be certain restrictions on his freedom of communication, he wants to know beforehand what these restrictions are, and he should be free to reject research opportunities which do not guarantee to him the minimum requirements of freedom which he considers essential for his work. The scientist should have the right to communicate freely with his colleagues in his own country and abroad and he wants to have no restrictions put upon his freedom of travel and of correspondence.

Scientists are citizens and they want to exercise their rights as free citizens. They should be free to participate in the cultural and intellectual life of the community. They should be allowed to participate in their government and, if this seems necessary, to criticize it. As citizens, scientists are prepared to accept the duties and responsibilities of citizenship and they are well aware of the fact that they must earn the right to be free men and women. They ask for some special dispensation because science, pure and applied, is so uniquely important to the welfare of the world and because advances in science are so critically dependent upon freedom.

The community which restricts the freedom of its scientists as citizens will lose in the end. In modern society, government at all levels is constantly faced with policy decisions involving complex scientific and technological matters. Wise decisions must rest in part on the advice of civic-minded scientists, and useful advice will hardly be forthcoming if scientists are not free to exercise their civic responsibilities.

Twenty years ago the problem of freedom of science did not seem very acute. The atomic bomb, jet propelled guided missiles and biological warfare were still to be found only in imaginative novels and in the comics. We still had to learn by experience how totalitarian states can restrict and pervert science. Then came the 1930's with the growing menace of Naziism. We saw how a government, bent on conquest and world domination, silenced the cultural and intellectual leaders who refused to give up their freedoms. In the war years of the 1940's we saw how science had to be used to forge the weapons without which it would have been difficult—or perhaps impossible—to defeat the enemies of freedom. The peace which followed did not bring a feeling of security. Nations that had worked well together toward the defeat of the common enemy grew distrustful of each other's motives and we seemed soon far from the hopes of universal and permanent peace that were felt in the world in the spring and summer of 1945. The average non-scientist had good reasons to become suspicious of modern science, which had produced horrible weapons of war, and there came a wave of distrust of the men and women who practised these strange arts—the scientists.

We have perhaps stressed too much in these first paragraphs the gap that may seem to separate the scientists from the non-scientists. Freedom of science is not separable from political and economic freedom, and freedom of science is at most only a part of the much broader area of intellectual freedom. A businessman, an industrialist, a technician, a worker, a farmer, a government official, or anyone who reads today about an attack upon a scientist's right to speak as he wishes, or to travel freely may wake up the next day to find himself criticized and maltreated in very much the same fashion.

IS FREEDOM really essential to scientific advance? Could science not advance equally well, if scientists were given all the necessary material support while being restricted in some of their freedoms? Scientists feel sometimes a little impatient when these questions are asked and they tend to brush them aside. One cannot, however, deny that in recent years such questions are being asked with increasing persistence, especially by those who would like to see scientific research closely coordinated with military needs. We shall try to answer these questions in the pages that follow, but we must point out here that science advances most effectively by confronting one point of view with others opposed to it. Under the fascist regimes and under fascist occupation the suppression of the freedom of discussion had a deadening effect on scientific advance.

How can we preserve the freedom of science? Scientists must be made to realize that their freedoms can only be

retained if they are willing to protest vigorously against all attempts at infringement of these freedoms. They must learn to take no freedom for granted and they should not relinquish their efforts to make it known publicly that without freedom society can never hope to obtain a maximum return from the individual scientist and from science as a whole. Scientists can not accomplish this task alone. They need the sympathetic support from non-scientists in all walks of life and in all professions. The freedom of science cannot be maintained unless there is in world opinion a climate favorable to it.

## The Universal Declaration of Human Rights

ON DECEMBER 10, 1948, the General Assembly of the United Nations "passed and proclaimed" the Universal Declaration of Human Rights. Here we find stated simply and directly the basic rights and freedoms to which the majority of the United Nations feel that their citizens are entitled. Several articles of the Declaration refer without ambiguity to the rights and freedoms that we have in mind when we speak of "freedom of science." Scientists must study the Declaration, not only because it is their duty as citizens to do so, but also as a simple matter of self-preservation. The Declaration must be made the basis for study and for argument, for freedom should be something that is thoroughly alive in the minds of men.

The Declaration contains altogether thirty Articles, several of which bear more or less upon the freedom of science.

Article 19 of the Universal Declaration of Human Rights reads:

> Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.

Article 19 strikes at the heart of what is meant by freedom of science. Other articles, notably Article 12,

> No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.

and Article 13,

> (1) Everyone has the right to freedom of movement and residence within the borders of each state.
>
> (2) Everyone has the right to leave any country, including his own, and to return to his country.

supplement this.

As a group these three articles give expression to the scientist's desire to be free to write, to speak, and to publish as he wishes, to distribute his published results freely and to have access to the publications of others, to travel to distant parts, to attend meetings, and to speak without restriction about his work. From the scientist's point of view, these three articles are important since they state clearly the minimum rights that must be guaranteed if there is to be freedom of communication.

We have tried to show already that it is wrong to think of scientists as a group of citizens distinct and different from the rest of us. To be effective in his work, the scientist needs as much as anyone a guarantee that he will be accorded the rights expressed in Articles 20-26 of the Declaration. These include the right to freedom of peaceful assembly and association, the right to take part in the government of his country, the right to social security, to free choice of employment without discrimination, the right to rest and leisure and to an adequate standard of living, and the right to an education.

Article 27 is especially important to the scientist. Paragraph (1) reads:

> (1) Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.

If this Article had been written twenty years ago, it would, to the majority of the world's scientists, have seemed like an admirable statement, but it would not have been considered by them as especially significant for the scientist. In recent years there has been a wide questioning of the scientist's right to free participation in community activities. In the days of the atomic bomb, scientists are supposed to be much more careful than non-scientists in choice of organizations that they join or in the popular causes that they wish to espouse!

Paragraph (2) of Article 27, which reads as follows,

> (2) Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

deals with such matters as copyright and patents. With regard to copyright, the scientist's problem is not different from that of any other author, and generally it is less acute. The right to the individual's personal material benefits from a discovery, the right to a full financial return on a patent, is one of great importance, especially to the workers in the applied sciences and engineering.

Rights and freedoms are meaningless unless they entail certain duties and responsibilities. We shall speak about these more fully in the concluding section, but we do well in closing this one to quote here the first paragraph of Article 29:

> (1) Everyone has duties to the community in which alone the free and full development of his personality is possible.

## Threats to the Freedom of Science

TOWARD the end of the nineteenth and the beginning of the twentieth centuries, the organization of scientific research was far less complex than it is today. In the United States basic research was largely confined to privately endowed universities. The first large research laboratories of industry were developing, but these had not yet reached the importance that they have today. The government's involvement in research undertakings was a relatively minor one. In Europe, scientific research was mostly done in government-supported universities, but, on the whole, scientists were free from extensive supervision and direction. Society accepted gratefully whatever scientific research had to give, and there was little attempt at direction or pressure from outside. The scientists did all of their own planning.

The differences between scientific research as it is practiced today and as it was fifty years ago are probably largely the result of the following circumstances:

1. Modern technology and industry are dependent upon the results of pure scientific research, supplemented by carefully-planned programs of development, most of which must be executed and directed by highly competent trained scientists. The giant modern industrial laboratory is very much the outcome of twentieth-century science.

2. The Communist revolution presented us with the attitude that the sole purpose of science is to serve the interests of the common people and that there is no science "divorced from politics anywhere in the world." In Communist countries the progress of science was to be fostered, but science became in some respects an instrument of the state.

3. In the non-Communist countries, the governments have had to assume increasing responsibilities for the social welfare of their people. Increased governmental participation in conservation of resources, power development, agriculture, transportation, and health has made it necessary for these governments to depend increasingly upon the advice and assistance of scientists.

4. World War I suggested, and World War II demonstrated, that science and technology are all-important to modern warfare. The modern military establishment resembles in many ways a giant laboratory for research and development.

5. Modern science is elaborate and expensive. An effective cyclotron cannot be built by one or two men with nothing but simple laboratory equipment available to them; the price of a powerful new telescope may readily be in excess of one million dollars.

6. Experience with planned research programs executed by carefully selected teams of experts has demonstrated that in certain areas of science, especially in medicine and in applied science, knowledge can be advanced rapidly by teams of research workers operating according to a carefully designed master plan.

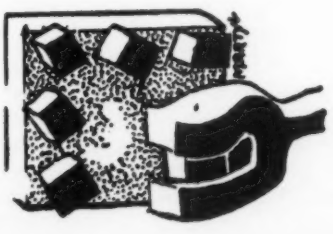
ONE immediate consequence of these trends toward bigness, toward organization and planning, and toward social and military significance, is that society will naturally seek ways of controlling and guiding the young monster, with, as an almost inevitable result, restrictions in the freedom of science. The idea of the patent, which had originally been designed to protect the individual inventor and to prevent secretiveness about inventions, was perverted to the extent that it has become more conducive to monopoly than to the thriving of a competitive capitalistic society.

The scientist in an industrial laboratory can never be completely free in the selection of his topics of research, and even the large university laboratory has become so complex that there has had to be an increasing emphasis on organization and direction. In a Communist society, scientific research is subject to planning from above, with social and political considerations frequently of greater importance than the interests of pure science; scientists who do not conform with political directives are in danger of being discredited, dismissed from their positions, and even purged. In non-Communist countries, the trends of governmental and military control are also generally restrictive in nature. To the political, and especially to the military, leaders, the scientist's desire for complete freedom of communication of ideas seems unreasonable, and unless these leaders understand from long and intimate association just how science operates, they are generally not in sympathy with the scientist's appeals for complete freedom.

SCIENTISTS of the present day can no longer take it for granted that they will be permitted to enjoy all of the traditional freedoms. In a society in which certain restrictions of freedom are unavoidable, there will always be a tendency to impose the maximum restrictions. We are not living in a benevolent utopia in which the scientist, in his traditional ivory tower, has his freedoms handed to him on a silver platter. No, if, as scientists, we want our freedoms, we must learn to fight for them.

Readers of the *Bulletin* need hardly to be reminded of the principal existing threats to the freedom of science. An entire recent issue was devoted to an analysis of the genetics controversy in the Soviet Union. The Soviet Government and the Soviet Academy of Sciences have seen fit to condemn officially and on ideological grounds the classical theories of genetics and have directed the geneticists of the Soviet Union to be guided in their researches by "Progressive Michurinist biology," which is the term used in the Soviet Union to indicate the Lamarckian approach.

No scientist, however friendly he may feel toward the Soviet Union, can ever tolerate this policy. For it is the basis of all true science that the results of experiments are the supreme arbiters in controversies and that political or doctrinnaire concepts have no place in scientific argument. Impartiality and freedom from bias are the very root of scientific inquiry. Science totally loses its bearings if the government can lay down rules with regard to permitted and forbidden directions of scientific thought. What has happened recently in the Soviet Union in the field of genetics will almost inevitably lead to the imposing of similar restrictions in other fields. There are already signs that physics, mathematical probability, and cosmic evolution are being subjected to ideological tests.



Threats to the freedom of science are not by any means limited to the Soviet Union, though it is true that they are there far more threatening than elsewhere in the world. In our own country we are plagued by *classification* of scientific research in certain areas and by *security regulations*, which, while they may be necessary for the safety of the nation, do not promote the free and unrestricted interchange of ideas among scientists. We have *loyalty investigations* of many varieties, some of them again justifiable in part on the basis of national security, but others which are little more than witch hunts, designed not only to discredit the individual who happens to be the victim, but generally aimed at suppressing through fear the free expression of opinion by others.

## Internationalism, Peace and the Freedom of Science

THROUGH the United Nations we are all participating in an experiment, the purpose of which is to discover ways in which the nations of the world can learn to live in peace while they continue to operate as separate political entities. The primary aim of the United Nations is not so much the avoidance of war as the aggressive promotion of world peace. Since a lasting peace can be had only in a world where there exists a genuine desire for international cooperation and friendship, it is pertinent to ask how the freedom of science bears on internationalism and world peace.

Science by itself is neither good nor evil, and the effect of science upon humanity depends wholly on the way in which we make use of the power given to us. In other words, science is impersonal, and whether or not the results which science produces will be beneficial to mankind depends upon the way in which the results of scientific work are applied. It is not possible to say simply that science has had either a bad or a good influence upon internationalism; the only statement that we can defend is that science exerts at

present a profound influence on peace and internationalism. To illustrate the point, we need to mention only one instance of a scientific development that is affecting international relations and which presumably will continue to do so for years to come: the advent and application of research in the properties of the atomic nucleus.

Much as we may hate war, the moral issues of the use of science in war are far from clear-cut. Let us consider the case of the atomic bomb. In the United States an overwhelming majority of the people holds that the use of the atomic bomb over Hiroshima and Nagasaki was justified because it helped to shorten the war and because for every human life destroyed in this bombing the lives of hundreds of soldiers were saved on both sides. On the other hand, we find that the use of the atomic bomb was considered an immoral war crime by large groups outside the United States and by many inside the United States. The use of science in war cannot be condemned on an absolute basis. Those among us who consider themselves the strongest supporters of the United Nations, would, I believe, be grateful for the modern scientific weapons of war if the need should arise to break the power of an aggressor intent upon destroying the foundations of the peaceful world which we are trying to build under the United Nations.

SCIENCE loses its impersonal character as soon as the issue of the freedom of science is brought into the argument. If the results of scientific research are freely available, and if the avenues of world-wide communication are kept free and open, then scientists, with the aid of men and women in many walks of life, can use science to help create an era of international good will. The fruits of science, freely exchanged, can assist in the building of a world in which hunger and privation are eliminated.

Intellectual freedom and freedom of communication are essential for the creation of a spirit of cooperation and mutual understanding among the peoples of the world. Free science makes a fundamental contribution toward world peace and world government through the support which it provides to the many rights and freedoms embodied in the Universal Declaration of Human Rights. The observance of the principles of freedom of inquiry and of freedom of thought in science is a constant challenge to anything in politics or in the cultural realm which tends to be dogmatic or absolute.

WE HAVE thus far dealt with science and the freedom of science and we have not referred to the scientists themselves. Scientists are citizens and I doubt that, on the whole, they are either very much better or very much worse citizens than the rest of us. Scientists are human beings whose primary social function it is to work to the best of their ability for the advancement of science, almost irrespective of the uses to which their discoveries might be put. It has been said that scientists cannot and should not be expected to foresee the consequences of their work and that they can influence only in very minor ways the uses to which their discoveries are put; I rather disagree with this point of view. A scientist who ponders the social consequences of his work is in a very much better position to arrive at valid conclusions than a lawyer or a politician who lacks the background for an understanding of the basic developments underlying the discovery. A scientist should not try to be omniscient, but in his own special area of activity he should be able to evaluate more clearly than his fellow citizens. As an example, we consider again the application of nuclear research, especially as far as it deals with the peaceful uses of atomic energy. Here is an area in which progress depends to a great extent on the readiness of the expert scientists in the field to take a leading part in the long-range planning. If this planning is to be done on a world-wide scale, it must be done in a spirit of freedom of inquiry.

Internationalism in science is at present subject to many forms of control. International barriers to the freedom of science are imposed because of fear of war, of political involvement, or of a possible loss of political advantage. Not infrequently they result from the narrow-mindedness and provincialism of those in power. Scientists know from everyday experience how close we are to one world of science and they have, therefore, a special responsibility of working for the removal of all unnecessary barriers.

The free interchange across national boundaries of men and ideas is basic to the advancement of science; almost every field owes its development to the work of men and women from many different nations. One does not need to go very far back in the history of science to prove this, for in every area of scientific research the present state of knowledge has a truly international background. I can readily illustrate the point with an example drawn from my own field of research in the structure and motions of our Milky Way System. Advances in this relatively small field were by no means made only by astronomers from one country. If I were to list the twenty astronomers who, over the past half century, have done the most for Milky Way research, my list would contain men and women from the United States, Great Britain, Canada, the Netherlands, Sweden, Germany, Switzerland, the Soviet Union, and India.

The story of the astronomers has its counterpart in every field of scientific research. No significant advance in medicine, for example, is the product of research by nationals of only one country.

PERHAPS the most dramatic demonstration of the international character of science was given in the wartime studies leading to the large-scale release of the energy of the atomic nucleus through the atomic bomb. At Los Alamos American scientists were working side by side with their colleagues from many European countries, notably with some of the world's most distinguished refugee physicists from Germany and Italy.

Science cannot be world-wide unless it is free. In most fields of research advance would have been stifled if there had not been a continued interchange of men and of opinions. Since a wide exchange of knowledge has traditionally been helpful to the advancement of science, scientists must ever be on the watch against threats to the freedom of international communication.

Non-scientists find it often difficult to imagine how strong can be the bonds out of common interests between scientists of totally different national backgrounds, living at opposite ends of the world, but working upon researches in the same general area. Does not the world at large stand to benefit by these international friendships among scientists? I think that the answer to this question is "yes," for, through the establishment of intimate contacts between scientists of different nations, we are laying in a perfectly natural way the foundations for widespread contacts of peoples of different lands—contacts

which, in the end, must help to make the peace secure.

TO THIS point we have principally stressed the immediate and practical benefits which the world may expect if we permit science to operate within the framework of its traditional freedoms. There are, however, certain intangible ways in which free science contributes to the creation of a climate favorable to world peace. We must here again distinguish clearly between science, the impersonal large body of verified facts and the correlations between these which we generally call the laws of nature, and "free science," which is the same science now made alive by the personalities of the free investigators, which creates in an adventuresome spirit, and the basic attitude of which is one of curiosity and of doubt.

Science, free or otherwise, will in the end almost surely lead to "one world." It does not necessarily follow, however, that this world is going to be a pleasant one, the kind of world in which we like to think that our children and grandchildren will grow up. Without freedom, this "one world" might well resemble in many ways the *Thousand Year Reich* which Adolf Hitler envisioned and which the United Nations were forced to oppose by fighting World War II. The chances for a free world, one in which the individual is given the opportunity of leading a full life, are, however, much better if science is allowed to make its contributions to society in an atmosphere of responsible freedom. Free science can be a strong ally in the common effort to achieve the "one world" of the Universal Declaration of Human Rights.

IT HAS been pointed out many a time, most forcefully in recent years by Harlow Shapley, Harold C. Urey, and Arthur H. Compton, that scientists come closer than any other group of individuals to being world citizens. This is not specially to the credit of scientists, since it is brought about by the natural "one-worldness" of their field, but it does place upon scientists certain definite responsibilities. In the words of Compton: "Scientists are prototypes of world citizens." As long as science is free, scientists are almost automatically joined in a world brotherhood, and it is fervently to be hoped that the scientists of the world will realize that in the Universal Declaration of Human Rights lies the promise of a guarantee for their cherished freedoms and that it is their responsibility to join the forces that must lead in achieving the universal adoption of the Declaration.

As citizens we are all free to express our preferences with regard to our desired forms of national government and of world government, but these questions need not divide us when we join in the world-wide campaign for the adoption of the Universal Declaration of Human Rights. We may compromise with regard to the political and economic systems under which we live, but no compromise is possible when we are called to the defense of our basic rights and freedoms.

## Implementing the Declaration

THE Universal Declaration of Human Rights is issued at a time when the freedom of science is under attack from many sides. Scientists have reason to be grateful to the drafters of the Declaration, for we have been given an inspiring restatement of basic principles to guide us in the fight for the freedom of science. While the strength of the Declaration lies in its general applicability, scientists, like any other group of people in our society, must give thought to ways of implementing the Declaration and they should try to put into words just how certain Articles of the Declaration affect them.

As scientists we do well to realize that in the fight for freedom of science we must strike a balance between defense and offense. Our principal defense consists in being ever watchful for unjustifiable infringements of our freedoms and in protesting promptly and vigorously whenever the occasion calls for a protest. As part of our offense we must demonstrate repeatedly, and by example, that freedom of science has paid off in terms of scientific advancement and that free science has a big contribution to make toward the creation of a meaningful peace and toward responsible world government. The advance of science without freedom must in the end lead to the enslavement of science, no matter what may be the nature of the economic or political system that poses restrictions.

It is worth repeating once more the truism that the facts of nature know no ideological boundaries. In the days of the Inquisition, Galileo fought the fight for the freedom of science and Bruno was burned at the stake because of his refusal to accept the Church's dogmatic attitude with regard to the Copernican theory of the solar system. Even in our enlightened twentieth century we have seen the spectacle of religious fundamentalism refusing to accept or consider the unprejudiced verdict of scientific experiment, and quite recently we have seen how totalitarian governments have found it impossible to tolerate in their countries scientists whose basic philosophy is that no single theory remains unchallenged and unchanged for long. To these threats scientists have invariably replied that the growth of science and of civilization is stunted as soon as we abandon the principle of freedom from dogma.

We have seen in the earlier sections that largely because of the growing importance of science in society, the outside world attempts to control and direct the development of scientific research. We need not enter again into the motives for this course of action, but we should recognize that besides fear and greed, or a short-sighted desire for power, there may exist an honest desire to advance civilization by leading science along clearly-defined paths. Unfortunately science does not advance in this fashion; science remains to a considerable extent accidental, and the opportunities are often not realized until in the course of the research one stumbles upon them by accident. At certain stages of development—especially in the area of technology—there is room for planned research and for operational research, but in much of our basic research we shall continue to work by the use of seemingly wasteful and haphazard methods, with the individual scientist or institution doing the planning.

Freedom implies an attitude of responsibility in the person who profits by it. While science certainly has important contributions to make to society, it cannot by itself give us the key to the solution of the complex problems of society. To be an effective practitioner of freedom, a scientist must be sensitive to the ever-present need for guidance and he must be especially careful not to confuse freedom with an unwillingness to cooperate.

THE Universal Declaration of Human Rights is like a call to arms to all men and women of good will. What opportunities are there for enlistment? Since in this article we are very much concerned with science and scientists, I wish to take advantage of the opportunity given to me and make certain very specific proposals about

the way the individual scientist can participate in the fight for freedom and the good life. I propose that every scientist should deliberately set aside one afternoon or evening a week—say three to six hours—to give thought to the broader social implications of his own work and of that of his fellow scientists and further that, depending on his personality and inclination, he should in some way make known the conclusions at which he arrives.

When scientists are approached with requests for participation in some socially significant activity, their excuse for refusal is frequently that the cause is one thoroughly deserving of support, but that the individual who is being approached is too busy with his or her own work to join. I have much sympathy with this point, but I would retort that in a period of world crisis like the present, the hope of survival lies in political and social action by the individual. It almost seems as though the time has come when we must all try to be good scientists on Monday, Tuesday, Wednesday, Thursday, and Friday, save the world on Saturday, and recuperate on Sunday!

THE choice about how to proceed with the discharging of one's social responsibilities is very much in the hands of the individual scientist. Some may find it more satisfactory to join organizations formed expressly for the purpose of study and action on the social implications of science. Others may prefer to work through their professional scientific organizations, and still others may prefer to work through community groups in which the scientists are at best a small minority.

The most important individual decision is that of the choice of the area, or areas (preferably not too many), for one's extra-professional activities. We should apply to this choice the same sort of judgment which, as scientists, we employ in the selection of a research topic. Special competence may play a role in our decision, or we may turn to a topic apparently passed over by others. An astronomer, for example, will generally have considerable experience in the field of international relations, but he would normally be neither a very much interested, nor an especially effective member of a group inquiring into revision of our patent laws. An atomic scientist may join the astronomer's study group on international relations, or he may wish to examine the problems of the possible usage of nuclear energy as a source of power in underdeveloped areas. Or, instead, he may decide that what his community needs most is popular education in the basic physics of the atomic nucleus. An engineer or industrial scientist may join in the nuclear physicist's project for the study relating to underdeveloped areas, or he may wish to undertake the patent study which failed to arouse the interest of the astronomer.

SOME scientists, just like many other citizens, have a hearty dislike for joining voluntary organizations; they may prefer study to action. From serious study and contemplation they may form opinions which in their total effect may do more good to the world than all the committee work taken together. As long as there is freedom of expression, a single intelligent individual can wield great power for the common good.

For many scientists education is an important professional activity. Those scientists who are good teachers and speakers will find popular education a rewarding field for extra-curricular activities. Much of the existing popular fear and distrust of science and scientists comes from lack of understanding. The need for popular education on basic nuclear physics has already been mentioned, and every field of science can present its own list of topics for mass education. The scientist who participates in popular education will generally discover that his science benefits by contacts with a great variety of people.

To date the emphasis has largely been on the popularization of the results of scientific research, and, while any form of science education is to the good, an overstressing of the results may develop an "amazing story" attitude in the listener and may not contribute to his understanding of the basic aims and methods of scientific research and of the spirit in which this research is done. Mass education should be only a part of our total educational effort. The most urgent need of the moment is perhaps for a program aimed specifically at our political and economic leaders, among whom we find often a tragic lack of understanding of science coupled with, at least in some cases, a strong desire to learn.

The United Nations and the Specialized Agencies are very much in need of sympathetic support from scientists. Several of these Specialized Agencies are to a large extent concerned with problems in pure and applied science and they depend heavily on the voluntary support from scientists outside the organization; UNESCO offers a wide area of activities for scientists who wish to contribute to international understanding and to world peace (see for example an article by the author in the July issue of *Physics Today*).

We noted earlier in this article that science seems to move us more and more toward a unified world. This implies the need for some form of world government, and it is not surprising that scientists are playing leading parts in the various movements toward world government. Scientists who are aware of the potential destructiveness of modern scientific warfare can probably make a greater contribution by working positively for world government than by the negative approach of fear propaganda. It has been suggested that scientists might well take the lead in conditioning the public mind for the acceptance of constitutional world government.

## Toward a Charter for Scientists

IN THE concluding sections of his great article on "Soviet Genetics," which are reproduced in the present issue of the *Bulletin*, Julian Huxley points to the need for a public statement of scientists faith, a *Charter for Scientists*. He suggests ways in which one might go about the drafting of such a Charter. I heartily agree with the reasons given by Huxley, and I would add that such a Charter is a necessity if we desire a brief formal statement about the specific rights and duties of a scientist that follow from the *Universal Declaration of Human Rights*.

In recent years there have been sporadic discussions about a Charter and some tentative drafts have actually been proposed. The author has been privileged, as a member of the Committee on Science and Its Social Relations (C.S.S.R.) of the International Council of Scientific Unions, to participate in the drafting of one such Charter at a conference in Paris in June, 1948. This

particular draft was admittedly a first attempt prepared for the purpose of arousing public interest, as the C.S.S.R. explained in its official announcement. I was given the assignment of publicising the Charter in the United States and of soliciting comments for use in subsequent drafts.

THE Charter for Scientists differs from the Universal Declaration of Human Rights in that the Charter stresses equally the rights and the obligations of scientists. Our critics drew attention to certain basic flaws in the Charter as originally proposed (see: *The American Scientist*, XXXVII, 123, [1949]). They pointed, for example, to the omission of one or more articles dealing specifically with the contributions that science can make to world government and with the obligation of scientists to emphasize the human values of science.

Some of the correspondents, while agreeing to the spirit of the first half of the Charter, the Article dealing with the obligations of scientists, expressed doubts about the need of giving to these points the formal status of a Charter. I rejected this objection, since in the complex world of today there are many scientists who look for guidance that can come from a well-written common code of the profession. It may be many years before we can hope to achieve the universal adoption of the Charter by scientific societies, by nations, or by international bodies, but in the meantime the mere existence of a Charter focuses attention upon the need for consideration of its basic premises. *I can see tremendous gains if individual scientists in considerable numbers were to decide solemnly and voluntarily to attach their signatures to the Charter.*

There were many strong and to some extent justified criticisms of the second part of the Charter, the articles dealing with the rights that scientists must claim in order to be able to fulfill their obligations to society. After a year of reflection, I can see that we lacked in wisdom when the last three articles were formulated. It has been pointed out to us that scientists should have no claims to economic security other than those accorded to all citizens. Serious objections have been made to the inclusion of the right of access to information about the purposes for which the work is being done and of the rights of the freedom to publish and of the freedom to discuss the results of one's work. It has been pointed out to us that the military could not possibly employ a research scientist who subscribed to these two articles and that it was unrealistic to expect industries in a competitive society to grant to their research scientists these specific rights and freedoms.

As one member of the C.S.S.R. who assisted in the drafting of the Charter (and I must make it clear that I am speaking solely for myself), I acknowledge the partial validity of the objections and I would be prepared to cast my vote for a modified version of the second part of the Charter. And yet, I do not regret that we stated these rights in the form that was adopted in Paris; we were perhaps aiming at an ideal rather than a practical solution of the difficult problems that scientists are facing today.

In a modified version of the Charter it may be desirable to omit altogether the reference to economic security in the first Article of the second section of the Charter, provided that it be understood that scientists, like all citizens, are entitled to the economic rights of the Universal Declaration. The second Article could be softened by insisting only upon the right to obtain *general* information regarding the purposes for which assigned research projects are being done; scientists must, however, insist upon the privilege of knowing the basic aims of the research projects in which they are asked to participate and no one should undertake to work on a project which he believes to be socially or morally wrong. The major objections to the third Article of the second section can probably be met by a slight change of wording and the addition of one clause.

AFTER careful study of the various comments in the Draft Charter, I have submitted to the C.S.S.R. a revised Draft Charter, incorporating many of the suggestions during the past year. The new draft is by no means a final one and the principal purpose of printing it here is to elicit further criticisms and suggestions.

In the end it will probably prove to have been all to the good that the C.S.S.R. by its somewhat precipitate and idealistic action focused attention, not only upon the need for a Charter, but also upon some of the main unsolved problems of the day. The battle for freedom of science is half won if we learn to recognize and isolate the principal threats and dangers. We have now as guides for battle the Universal Declaration of Human Rights and the feeble and untried weapon of a Charter that is yet imperfect. May the discussion proceed.

## A REVISION OF THE CHARTER FOR SCIENTISTS PROPOSED BY BART J. BOK

IN consideration of the prominent place which science holds at present in society, and of the rapid transformation of the world through the application of science, and in consideration further of the fact that scientists can obtain and use information not readily available to others, the scientific worker has certain obligations toward society over and above the ordinary duties of citizenship.

It is therefore the duty of every scientist:

a) to maintain a spirit of honesty, integrity and cooperation;

b) to examine searchingly the meaning and purposes of the work that he or she is performing, and, when in the employ of others, to inquire into these purposes and to evaluate the moral issues that may be involved;

c) to promote the development of science in the ways most beneficial to all mankind and to exert his or her influence as far as possible to prevent its misuse;

d) to assist in the education of the people and of governments in the aims, methods, and spirit of scientific research and to keep them abreast of scientific progress;

e) to promote international collaboration in science, to work for the preservation of world peace, and to contribute toward a spirit of world citizenship;

f) to emphasize and develop the human values associated with science and technology.

In order to be able to fulfill these obligations, scientists must claim certain rights, the principal ones of which are:

g) the right to participate freely in all activities permitted to the average citizen;

h) the right to obtain general information about the purposes for which assigned projects are being done;

i) the right to publish the results of his or her researches, as well as full freedom to discuss work in progress with other scientists, except where these privileges may have to be restricted for socially or ethically justifiable reasons.

# WASHINGTON NOTES

*Anne Wilson Marks*

*Washington Correspondent for the Bulletin*

AS THIS is written, Congress, in a last minute rush toward adjournment, appears to have finished with atomic energy for this Session. Since January it has got in a good many licks on that subject, but what was to be the feature attraction —the Great Atomic Energy Investigation of 1949—turned out to be a dull, if sometimes noisy, sideshow.

A succession of weary hearings in June and July built up a ponderous record distinguished only by the feebleness of the attacker and the extravagant claims of the defenders. Week after week Senator Hickenlooper nagged away at David Lilienthal. Costs of AEC community facilities, he charged, were too high. Security was lax. There were restrictions on free private enterprise at Hanford. There was a virtual newspaper monopoly at Richland. The Senator wanted to know why it had cost $10,000 to landscape the gardens of a cottage at Los Alamos, why concrete slabs under garbage cans at Oak Ridge ran to $90 apiece, and why the Commission had originally claimed the famous lost uranium disappeared in a brown bottle when it was now clear that said bottle was white.

Hickenlooper's occasionally telling points—the Oak Ridge Natural Gas project, the Hanford six-million-dollar cost estimate which surprised everyone when it turned into a twenty-five-million-dollar plant—were buried in the miscellany of minor complaints. The whole affair sank of its own weight sometime in July, and all that's needed to mark its demise are the traditional Committee reports—majority and minority.

These latter are being held up by a rather irritating loose end which will have to be tied off somehow before the final reports are written. Hickenlooper alleges that the Commission cleared about thirty bad security risks. These personnel cases are now hung up in the Committee, where in order to preserve the anonymity of the subjects, they are to be considered in executive session. Apparently the Committee is uncertain as to what action it is expected to take on them. For many weeks now it has resolved that uncertainty by doing nothing. A formula is needed that will satisfy the Senator from Iowa and get the Committee up from out of in under.

While Hickenlooper and the Commission were trying to out-talk each other, the men in Congress who hold the power to hurt more than an agency's reputation worked quietly in the background — the Senate Appropriations Committee was putting the finishing touch to a little hatchet work on the Atomic Energy Commission's budget.

It started in April, when the House sliced some seventy-six million dollars off the AEC's billion-dollar request. In making the cut, the House Appropriations Committee took pains to stipulate that none of it should come out of the "weapons program." The Commission was instructed to make up the seventy-six million-dollar reduction by applying a 15 per cent cut to the remainder of the budget. Apparently, the Committee did not notice that the "remainder" included such items as "source and fissionable materials." (As it was later remarked: "The House has . . . given you the money for X thousand apple pies, but they have furnished you very little money to buy the apples to go into the pies.")

In explaining the cut during debate in the House, Committee spokesmen plainly indicated their suspicion of extravagance everywhere in the AEC enterprise. Maybe they couldn't understand such secret and complicated items as source and fissionable materials, reactors, etc., but they did know something about costs of housing, personnel, and administration. And these costs, they thought, were certainly excessive.

The bill passed the House and went to hearings in the Senate. Everyone expected the Senate to restore at least some of the House cut. As a result of the howl set up by the Commission and the Chairman of the Joint Committee, the Senate group did correct the "misapprehension" in the House over the relationship of "source and fissionable materials" to the bomb program. "In this connection," said the Senate report brightly, "the committee was unanimous in its wish to maintain the level of the programs of procuring and processing source and fissionable materials and of weapons production . . ."

After these generous and understanding remarks, the Senate report went on to say it would not restore the money cut.

Instead, it directed the Commission to take the reduction, but in other fields of its operations, "such as administration, community programs, biology and medicine, physical research, and . . . such aspects of reactor development as are not immediately necessary for national security." This action means that the Senate committee was compounding, rather than correcting, the absurdity of its House counterpart.

Obviously, the AEC could not sustain such a lopsided bite out of its budget. Perhaps the Appropriations Committee knew it. Legislators might feel that the AEC had no sense whatever of the value of the taxpayer's dollar, but the politicans balked at putting the finger on the sacred bomb. With all the frustration that dilemmas uusually produce, the Senate made an irrational cut in the AEC budget and left the Commission to get out of the fix the best way it could.

When the bill went to conference, the Conference Committee of the two houses approved the cut, but gave the Commission considerably more latitude to make a more practical distribution of the reduction over its entire program. This, together with a little thing known as the "unobligated balance," left over from prior years' appropriations, will probably go a long way towards easing the Commission's "money" hurt, if not the sting of the Congressional rebuke.

THE Appropriations Committee had still other ideas. It recommended to the Senate two "legislative amendments," more commonly referred to as "riders" to the money bill. The first of these constituted a further effort to gain some control over AEC spending. Senator Hickenlooper may not have been able to make much of the cost overruns at Hanford, but the

Appropriations Committee gave them a cold, hard look. The rider, which breezed through the Senate, forbids the Commission to start new construction projects not provided for in the budget for the current year, or which exceed the estimate contained in that budget, unless specifically approved by the Bureau of the Budget and reported to the Appropriations Committee of both Houses and to the Joint Committee on Atomic Energy. It provides, in addition, for a stop-order on community facility construction as soon as such construction passes estimated cost. From now on, overruns will have to be explained and justified to a lot of people before construction can be continued. Had such a rider been in the bill in previous years, the Commission's explanation of the Hanford six-million-dollar building and how it grew would have been given to the Bureau of the Budget rather than to a Senate investigating committee after the fact.

THE Appropriations Committee's second rider dealt with the Commission's fellowship program—the program, which through an unwitting award to a Communist had put Congress into a frenzy in May and helped precipitate the investigation. The Committee rider, briefly stated, proposed that fellows for nonsecret work must stand a full FBI investigation just as fellows for secret work were already required to do under prior law. The rider passed the Senate by a voice vote—which means that there is no record of how the members stood on the issue.

It was fairly clear from the debate, however, that only Glen Taylor was prepared to cast an opposing vote. But what is much more important, a number of Senators unwilling to appear flatly in opposition nevertheless felt it necessary to address some searching questions to the whole problem of keeping subversives from enjoying Government bounty. In so doing, they fostered a debate which, in perspective, may assume an importance far out of proportion to the specific issue of AEC fellows.

Senator McMahon used the occasion to criticize the notion — commonly in vogue—that derogatory information is equivalent to proof:

> For myself [he said] and contrary to the position of some members of the Senate that any derogatory information submitted by the FBI or which may be contained in an FBI report *ipso facto* and by its *ipsi dixit* forever bars from employment the person thus reported upon, I wish to speak definitely against any such proposition.

He thought that derogatory information from unidentified informants could be given but little weight.

> If I were on the Commission [Senator McMahon continued] and saw reports from T-1 and T-2 and T-3, I am frank to say that I would not pay much attention to such confidential reports, but I would pay attention to testimony listed in the file by persons who were identified and whose information I could evaluate. In other words, we must weight the importance of such information as against the importance of permitting the FBI to maintain the confidential aspect or nature of its informants.

Senator Morse, picking up at this point, suggested that there need be no difficulty in reconciling the investigative agencies' need for confidential informants with the individual's right to know his accuser. Confidential informants provide clues, leads, information useful in manifold ways.

> I do not see why [said Morse] the FBI cannot take the information which it obtains from one of its secret agents—and it should have secret agents—and put that information into channels where it can be used without the necessity of disclosing the identity of the informant.

But if protection of the source of intelligence requires that his identity be kept secret, then apply the same rule to fellows as is applied to an accused in court. Let him be condemned only on evidence that can in fact be disclosed to him:

> As every good police department knows [Morse explained], because it is impossible to use the best type of evidence which it is wished to use in a case, the next best type of evidence is used, which certainly will be better than subjecting a person to a charge which he cannot answer, or as to which he cannot defend himself because he cannot discover the nature of the charge . . .

Any other course is unjust for the prospective fellow, said Morse:

> [Although] no student has the right to a fellowship, it seems to me he does have a right . . . not to be taken by his Government up to the point where it becomes known that he is being considered for a fellowship . . . and then if he is denied a fellowship, have the rumor go abroad that the denial was because he was not found loyal to his Government, when he did not have a chance to answer the evidence which was submitted against him before the Commission by secret information collected by the FBI, the source of which would not be disclosed . . . I do not want the Commission to act on behind-the-curtain secret information which cannot be brought out into full daylight. That is what I am pleading for . . .

Claude Pepper, of Florida, whose eloquence is almost unmatched in the Senate, and who spoke at length, completed the series of criticisms by pointing to one of the most serious but least noticed weaknesses in clearance procedure—the failure to give a hearing to a rejected applicant:

> There is no right of appeal given in the amendment to a young man who wins this honor but is denied it because the FBI says something against him that may cause the Commission to consider that he is not a fit subject. He is condemned without a hearing . . .

BUT despite their criticisms of the implications and defects of the Appropriations Committee rider, neither Morse nor Pepper nor McMahon, nor others who doubtless shared their feelings were prepared to vote against it. The combination of Communism and atomic energy constitutes a formidable bugaboo. It is hardly so formidable as to scare away such men as these from what seems at first glance a clear matter of principle.

## Text of Appropriation Rider

*The following rider attached to the Independent Offices Appropriation Bill, passed the Senate on August 2.*

"No part of any appropriation contained in this title for the Atomic Energy Commission shall be used to confer a fellowship on any person who advocates or who is a member of an organization or party that advocates the overthrow of the Government of the United States by force or violence or with respect to whom the Commission finds, upon investigation and report by the Federal Bureau of Investigation on the character, associations, and loyalty of whom, that reasonable grounds exist for belief that such person is disloyal to the Government of the United States: Provided, That any person who advocates or who is a member of an organization or party that advocates the overthrow of the Government of the United States by force or violence and accepts employment or a fellowship the salary, wages, stipend, grant, or expenses for which are paid from any appropriation contained in this title shall be guilty of a felony and, upon conviction, shall be fined not more than $1,000 or imprisoned for not more than one year, or both; Provided further, That the above penal clause shall be in addition to, and not substitute for, any other provisions of existing law."

One of the clues to an opposition that stopped short of a "nay" vote may be found in Senator McMahon's closing remarks. As the Chairman of the Joint Committee, he would have been the logical leader of any real opposition to the amendment. He thought it patently unwise and unnecessary: "I should like to point out to the Senate that what we are doing is imposing a test upon students . . . which we do not impose on any grant we give to students in any other field or in any university." Nevertheless, "I have reluctantly been going along with this amendment." Why? Perhaps because AEC ought not be in this program in any event. "Nonsecret fellows truly in my opinion should not be supported by the Atomic Energy Commission . . . . The law as it now stands takes care of the fellows in restricted work." Nonsecret fellows "should be supported by the National Science Foundation, and I hope that when the National Science Foundation comes into existence . . . the necessity for investigations of nonsecret fellows will disappear."

Possibly other members of the Senate who might have been expected to join McMahon in opposition also felt that the Commission should never have taken on nonsecret fellowships, that they wouldn't continue the program much longer, anyway, and that an issue coming up in this fashion was not sufficiently important to warrant a stiff fight.

IT IS difficult to be critical of such an attitude, considering the fact that groups outside the Congress didn't seem to take the issue seriously enough to put up a real fight, either. There was some buttonholing of Senators; a few letters came in to their offices from important people in the academic world; a few influential groups declared their opposition to the amendment. But a check on the Hill indicates that in their total effect these attempts were ineffective, spotty, and half-hearted.

It is clear that for the Commission —all considerations of morale and precedent aside—the fellowship amendment produces an administrative horror. Whether, as a practical matter, it will now be able to grant nonsecret fellowships at all is an open question. Since we shall have a National Science Foundation sooner or later, the loss of nonsecret fellowships in the atomic energy program may not in the long run be a serious one. The real worry is whether the mauling which Congress has given the AEC in recent months will leave the Commission with a chronic case of bureaucratic jitters.

THAT the AEC is shaken is suggested by the contents of its Sixth Semiannual Report to the Congress, which appeared on August first. A jaundiced eye could see in that report a reflection of everything that has happened to the Commission in its relations with Congress for the past six months. It began when the Commission came in for the first real congressional heckling of its career in Senator McMahon's open hearings in February. The stir at that time was over the publication of certain facts and photographs in the Fifth Semiannual Report. Months afterward, the furor over whether or not the AEC was sufficiently security-minded had not abated.

The Sixth Semiannual Report is a handsomely got-up job. There is a chapter in it on particle accelerators. In the Fifth Semiannual Report there was a picture of a particle accelerator. Senator Tydings didn't like publishing pictures like that. There are some pictures in the current report—fifteen or twenty of them. There is a radioactive fish, a hornet having a radioactive meal, an unidentified girl sitting in a lab at Los Alamos, a mouse in a bottle, nine cows, a plowed field, a man with a geiger counter in his hand, and some microscopic slides, to mention a few.

The Foreward to the Report points out that "in accordance with the pattern established for the mid-year report in 1948, the current report further gives a comprehensive review of one of the major phases of the national atomic energy program—the biological and medical activities." It would be facetious and unfair to criticize what seems to the layman's eye to be in fact a comprehensive and interesting exposition of this phase of the AEC's activities. But there is an appendage to this report which is labeled "Major Developments in Atomic Energy Programs." Of these vague pages *Time* Magazine says: "[They] sound like a Soviet report on the current five-year plan. . . . There is not a firm figure to inform, alarm, or comfort the nation's potential foes or friends."

Included in this uninformative chapter is a heading entitled "Reactor Development." It occupies one page of text. It tells us that Dr. Hafstad is the Director of a program that is centered at the Argonne and that will require the training of a lot of men. Chairman Lilienthal at his press conference on the release of the Fifth Semiannual Report last January, promised a comprehensive report on reactors[1]—"perhaps in a matter of six weeks." As a substitute for that report we are given the following:

> The choice of specific reactor projects for development in the immediate future must be based upon considered judgments as to the most promising technical solutions to problems so complex and so completely new that before final answers are obtained the present approaches may have to be abandoned entirely and new projects established. Our present knowledge cannot guarantee success in any one of these projects but is sufficient to point clearly to the lines of development that are being followed.

Six months of trouble can bring any agency to the point of that timid squeak. The Atomic Energy Commission has been jumped for reporting too much too graphically to the Congress. It has been pushed around by the frustrated and suspicious Appropriations Committees, which disliked doling out large sums of money for vaguely extravagant things they didn't quite understand. Along with Senator McMahon, the Commission took a wrist slapping from the President himself over the question of secrecy of stockpile data. Then it had to explain why a fellowship had been given to an avowed Communist, and worse still, what had happened to thirty grams of missing uranium. Its internal disagreements over the foreign distribution of radioisotopes and over the security clearance of Dr. (now Senator) Graham were gossiped around Capitol Hill for months, eating into AEC's store of congressional good will. Finally, Senator Hickenlooper blew his top, put the Commission through the tortures of an investigation—in the hottest Washington summer in fifty years.

THERE'S no question about it. The Atomic Energy Commission has had a rough six months. However shaken, the Commission has, on the whole, given a good account of itself. Congress ought to leave town soon. The Commission, with any luck at all, will have at least four months in which to gird its loins. It will be interesting to see, when the bell rings next January, whether the AEC will come out fighting.

[1] For recent information on the reactor program the reader is referred to Dr. Bacher's testimony at the Joint Committee hearings, p. 242 of this issue, and his article on the Reactor Program in the March, 1949, *Bulletin*. [Ed.]

# THE GREAT INQUIRY: TESTIMONY AT AEC HEARINGS

Senator Hickenlooper's charge of "incredible mismanagement" directed against Mr. Lilienthal, Chairman of the Atomic Energy Commission, and Mr. Lilienthal's request for investigation, were reprinted in our last issue. We now print a condensation of the transcript—over 2,000 pages in length—of the 23 open hearings held between June 1 and July 11. Following what has become a BULLETIN tradition, we are giving as extensive a report of this investigation as our space permits and are trying to preserve as far as possible, the original wording of the witnesses and the Committee members. However, condensation from 2,000 to 75 pages required a drastic abbreviation. We have attempted to make this condensation as fair as possible to all parties, and to avoid distortion in details. However, we want it to be clearly understood that this report does not consist of verbatim quotations throughout. For these, the reader is referred to the full transcript published by the Government Printing Office.

## The Personnel Turnover June 1 and 2

SENATOR HICKENLOOPER: This is an inquiry into the administrative policies of Mr. Lilienthal. I will resist the attempt to introduce extraneous matters.

For the past two and a half years I have observed Mr. Lilienthal and have been forced to conclude that he is inadequate in his present position. If Mr. Lilienthal made mistakes in TVA, only our domestic economy would have been involved. Misdirection of policy in the Atomic Energy Commission can cost us our pre-eminence in the atomic field.

I believe a fundamental task of administrative competence is the continuity of personnel.

Mr. Lilienthal, you are acquainted with Herbert Marks?

MR. LILIENTHAL: Yes.

SEN. HICKENLOOPER: Do you consider his resignation a loss to the Commission?

MR. LILIENTHAL: Yes, I do. He is an able lawyer.

SENATOR HICKENLOOPER proceeded to question Mr. Lilienthal in a similar way about every other key employee who has resigned in the last two years, including Assistant General Counsel Edward Huddleson; Mr. Adrian Fisher, the General Counsel succeeding Mr. Marks; and Mr. Lyle Belsley, Secretary of the Commission.

Referring to the resignation of Admiral Gingrich, Director of Security and Intelligence, Senator Hickenlooper noted that he was not an intelligence officer, and wanted to know why no FBI-trained person was selected for this post.

MR. LILIENTHAL named several individuals recommended by the FBI whom the AEC was unable to persuade to accept the position even temporarily.

REP. PRICE: Are your charges directed against the Commission or against Mr. Lilienthal?

SEN. HICKENLOOPER: It's essential for me to present my matters in an orderly fashion. Matters with respect to the general Commission can be discussed at a later date.

MR. LILIENTHAL: The statute provides that management matters may be delegated to a General Manager. There is no power delegated to the Chairman.

SEN. HICKENLOOPER: Do you consider Dr. Fisk's termination a loss to the Commission?

MR. LILIENTHAL: I spent a good many hours explaining just how much of a loss but without success.

SEN. HICKENLOOPER came to the resignation of the Personnel Security Review Board.

MR. LILIENTHAL: This was an advisory board, and it was understood that it would be temporary.

SEN. HICKENLOOPER: In talks with Justice Roberts, I was not given to understand that he at that time considered it to be temporary.

MR. LILIENTHAL: I think there is no question as to their charter.

Senator Hickenlooper referred to the changes in the area management.

MR. LILIENTHAL: Mr. Franklin, Oak Ridge manager, came on the understanding that in two years he could return to private industry, where he can expect to become a prominent executive at the compensations available in industry.

The cases of Dr. Fisk and Mr. Franklin are typical of people who are dubious whether they will care for Government service, but are anxious to make a contribution. We have hoped they could be persuaded to stay on.

SEN. HICKENLOOPER: Do you consider that Mr. Carlton Shugg did a good job as Manager at Hanford?

MR. LILIENTHAL: A phenomenal job, considering what he took over.

SEN. HICKENLOOPER: Why was it necessary to bring him to Washington as Deputy General Manager?

MR. LILIENTHAL: He was the best man for the job of Deputy General Manager, created last summer.

SEN. HICKENLOOPER asked about Dr. Philip Morse, Director of the Brookhaven Laboratories. Mr. LILIENTHAL pointed out that Brookhaven is operated by the Associated Universities, who were responsible for "selecting Dr. Morse in the first instance, and for replacing him in the second instance."

SENATOR HICKENLOOPER noted the resignation of Commissioners Mr. W. W. Waymack and Dr. R. Bacher and concluded:

The Fifth Semi-annual Report of the Commission said:

"The number of people employed by the Commission is small, and the turnover among them is relatively low." In the two-year period, 1947-48, however, 4,366 employees have been separated, which means a turnover of 87 per cent. I believe I have put in ample evidence of lack of continuity in Commission's key positions.

MR. LILIENTHAL: The problem of continuity can best be illustrated by a few particular cases. Bill Waymack felt keenly the strain of this undertaking. His resignation raises the question how one can hope to keep as Commissioners individuals in mature years, trying to start a new technology under conditions alien to the experience of American industry. In his letter of resignation, Waymack said: "I believe that the task of getting things started soundly has been well accomplished. Association with my fellow Commissioners has been not only one of the pleasantest but also one of the richest experiences of my life. The way staff members, drawn from industry and government and academic life, have responded to the unique challenge of this operation, driving themselves without thought of exhaustion, is something that I have marveled at and that merits the country's appreciation."

Dr. Bacher's case illustrates a different point. The soundness of his reasons in returning, in his mid-40's, to his profession, as Chairman of the Department of Mathematics, Physics, and Astronomy at Cal. Tech. needs no elucidation.

Dr. Fisk is a man in his 30's of great talents as a physicist with a lot of savvy and organizational ability. He can expect to become one of the principal officers of the Bell Laboratories. What is there that could persuade him to continue as Director of Research for the Atomic Energy Commission? I wish I knew the answer. Dr. Pitzer, his successor, a brilliant young man in his field, said that he would undertake the job only on a temporary basis.

Jack Franklin went to Oak Ridge from a very important post in industry. He found it discouraging to spend as much of his time explaining what he had done as trying to get things done. We who have been in the Government service a long time, regard this part of the price one pays for Government administration, but industrial men find it discouraging. The McMahon Act provided that the Commission might, when needed, exceed the Classification Act. The first appropriation measure limited this flexibility to technical personnel, but the real problem is with the management people.

On June 2 MR. LILIENTHAL continued: Senator Hickenlooper said that the separations in 1947-48 were 87 per cent. He included people who were fired for cause, or left because of reduction in force, or died, retired under compulsory retirement, or had babies. The latter may be an evidence of incredible mismanagement, but not on the part of the Commission.

Voluntary separations were 61 per cent in 1947 and 36.9 in 1948, compared to 49.7 and 33.3 per cent for the Government as a whole, and 58.1 and 54.8 per cent for manufacturing industry.

Except for two employees of the Intelligence Division, who resigned because of policy differences with Admiral Gingrich, none of the key employees mentioned by Senator Hickenlooper seemed to have resigned because of dissatisfaction with the management. None of them was asked, or volunteered, to testify in support of the accusation.

Later in the testimony, SENATOR HICKENLOOPER read the letter of resignation of DR. WENDE, an employee of the General Electric Company as contractor to the AEC. It said:

I became convinced that nowhere in the Commission is there a hard knot of practical business sense that can effectively manage a program in industrial development. Such knowhow appears to be alien to governmental agencies, and must of necessity come from industry.

General Electric inherited an organization which was below a safe minimum strength for routine operation. Lacking a realistic evaluation of its own limited capabilities, this organization has accepted every demand placed on it by the Commission.

The unfortunate but predictable result is that the Company has been committed to do things which exceed its abilities.

To this MR. WINNE, Vice Chairman, General Electric Company, answered that Dr. Wende contributed a great deal to the operation of the Hanford Works. We were very sorry to see him leave. We admit that we have been working under pressure, but we have been capable of operating that plant and of improving its operations very materially.

REP. HOLIFIELD: Dr. Wende says: "I am convinced that a solution cannot exist without a radical change whose shape I cannot foresee."

SEN. HICKENLOOPER: Dr. Wende may be like the fellow who said he never laid an egg, but he could tell a good one from a bad one.

REP. HOLIFIELD: The Senator may be an expert in the matter of laying eggs, I do not know.

## Emergency Clearance June 2 and 6

SEN. HICKENLOOPER: The law intends that before individuals are cleared for access to restricted data, the FBI must conduct an investigation, and make a report "except as authorized by the Commission in cases of emergency."

In 1947, the Commission issued 1237 emergency clearances. I remonstrated, in extensive correspondence. However, in 1948, 2,103 persons were given emergency clearances.

In the face of all the publicity relative to atomic security, I consider this brazen effrontery.

REP. COLE: Who are these people, janitors?

SEN. HICKENLOOPER: In March, in one area, everybody was on an emergency clearance, including top-flight people on the technical end. Most of the people have later proved to be trustworthy. However, ten subversives could be cleared on an emergency basis and have from 60 to 90 days before their background would catch up with them.

MR. LILIENTHAL: Admiral Gingrich had explained to this Committee the need for the emergency clearance procedure. No one has been granted emergency clearance without an FBI file check.

THE CHAIRMAN: What is a file check?

MR. VOLPE: We send to the FBI a security questionnaire and fingerprints, and they make a check of their records.

SEN. HICKENLOOPER: Do you believe that if a subversive thought he had no record, he would put down on his questionnaire derogatory information?

MR. VOLPE: We face this problem even with full FBI investigation. I think the FBI is doing an excellent job of keeping tabs on subversives, even without our submitting to them a single questionnaire.

SEN. HICKENLOOPER: I am talking about the diabolically clever infiltration that a determined and cleverly organized espionage system would use, and they are not going to use people who have a record at the FBI.

MR. VOLPE: My guess is that this diabolical individual is not going to expose himself by letting a questionnaire and fingerprints go to the FBI.

SEN. HICKENLOOPER: He can infiltrate himself, stay 60 days, and then a Polish boat will let him get on, and the British

courts will free him. There are millions in this country who have no record of fingerprints with the FBI.

MR. LILIENTHAL: You would be surprised how few there are.

SEN. MILLIKIN: The whole Atomic Energy Act was framed in terms of security.

MR. LILIENTHAL: Security is a question of whether the country's strength is increased by the actions of the Commission. To think of security only in terms of fences, and safes, and background examination of individuals, is a grave mistake.

Last Monday, I discussed with two important industrial executives their willingness to undertake a measure of Sandia Base that will immeasurably strengthen the security of this country, in engineering, deliverability, and usefulness of atomic weapons. Should we have waited 60 or 90 days until a full FBI investigation is made?

In 1947 and 1948 there was an emergency at Hanford—a threatened breakdown of pile operation. One necessity was the reactivation, or building of a new plant, not at Hanford but elsewhere, to provide materials for new piles. To lose 60 to 90 days would have been a very serious thing.

SEN. HICKENLOOPER: It was not a sudden emergency.

MR. LILIENTHAL: I must disagree: It easy to be calm about it now. Another case: A contract with the Bendix Corporation was just as vital to security as fences and clearances and property accountability. In my opinion, more vital. Had we not moved with urgency, we would have been castigated for not using the provision which Congress put in to meet such a situation.

SEN. MILLIKIN: There were 2,103 emergencies in 1948?

MR. LILIENTHAL: You cannot just clear a top executive. They require clerical and other assistance.

The Commission after much too short a preparatory period engaged in weapon tests at Eniwetok in April, 1948. There appeared a number of places where additional skills would make the tests more valuable.

In the interests of security the emergency clearances granted there were within the spirit of the law, and within the discretion of those to whom authorization was granted.

SEN. HICKENLOOPER: The Eniwetok tests were our most secret experiments. The Committee knew their approximate time weeks in advance. There was ample time for investigation, and yet many emergency clearances were given.[1]

MR. LILIENTHAL: People who were faced with the carrying out of this enterprise would not agree, from the Commander of the Task Force down through the Test Director.

SEN. MILLIKEN: The security matter has two aspects, the affirmative and the negative. There can be no defense of carelessness in one aspect on the ground that there has been great progress in the other.

MR. LILIENTHAL: Carelessness can never be defended.

REP. COLE: Do you honestly feel that inability to hire a clerk would have jeopardized the security of the nation?

MR. LILIENTHAL: Let me take the graphite plant. You had to activate it as a whole, and this included clerks and secretaries. Members of this Committee are aware how helpless a man is without his secretary.

THE CHAIRMAN: How many of those given emergency clearances have been discharged after the FBI investigation?

MR. VOLPE (General Counsel of the AEC) answered on July 11 that out of 4,000 emergency clearances, one case later produced evidence of Communist affiliation.

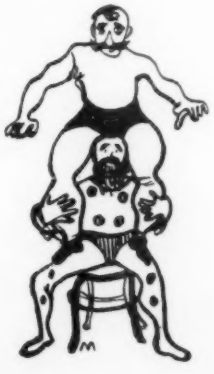
On July 3, GENERAL MCCORMACK, Head of the Division of Military Application was asked:

REP. HOLIFIELD: In your opinion, were the emergency clearances at Eniwetok made with disregard of security?

GENERAL MCCORMACK: I think it was very well done.

REP. HOLIFIELD: If more complicated methods had been adopted, would it have prevented the tests?

GEN. MCCORMACK: It is like a chain reaction. You have to clear first a person who can decide whether his organization can do it. When he makes up his mind, there must be one, two, or six



key people who have to build their part of the pyramid. It builds downward. If there happened to be four steps, and the difference between emergency and full procedure is a month, the delay is four months.

On July 11, MR. VOLPE, returned to the Emergency Clearance question:

In August, 1947, General Electric Company wanted to bring in immediately 23 people for the purpose of discussing very urgent work at Hanford. We went over the provisions of the law.

In the absence of a flat prohibition of emergency clearances for contractor personnel, the overriding consideration appeared to be the directive that the Commission should conduct its affairs so as to assure common defense and security.

We discussed that matter with the Attorney General who agreed that Congress did not intend that everyone be investigated by the FBI before work could be undertaken, and that the problem was whether we should jeopardize by delay the defense and security of the United States. Thereafter, I discussed the question with Senator Hickenlooper, and left with the impression that there was no disagreement on legal interpretation.

SEN. HICKENLOOPER: My recollection is that our discussion went entirely to cases of emergency, where the Commission would find it necessary to get in some noted specialist, not to wholesale hiring.

There was a problem discussed at that time involving some technical things of which I knew nothing.

MR. VOLPE: The question is not one of legal authority, but one of application. Four thousand emergency clearances out of 136,000 investigations appears to be a reasonable proportion.

SEN. HICKENLOOPER: You have no legal authority for the wholesale clearances of what we might call run-of-the-mill technicians.

The law ought to be changed rather than the Commission take it into its own hands.

[1]On July 3, Senator Hickenlooper denied having questioned the emergency clearance granted for the Eniwetok test, and had the above passage read back to him by a member of the committee.

# The Case of Mr. A
## June 6

SEN. HICKENLOOPER: Mr. Lilienthal, do you consider Communism a cynical and ruthless power which by guile, misrepresentation, infiltration, and violation of all the standards that the American people hold dear, seeks to overthrow our Government?

MR. LILIENTHAL: I do. The words sound familiar.

SEN. HICKENLOOPER: They are your own words. Do you consider yourself a liberal groping to discover if U. S. Communists take direct and unquestioned orders from Moscow?

MR. LILIENTHAL: I certainly am groping, as I think most people with any humility are, but I am not groping on this particular subject.

SEN. HICKENLOOPER: Senator Graham of North Carolina said that the nation's "liberal" element is "groping" to discover if U. S. Communists really take orders from Moscow. As one of the "gropers," he named "Atomic Energy Commission Chairman David Lilienthal."

MR. LILIENTHAL: The characteristics of the Communist Party is the subject of a proceeding in the Federal District Court for New York, and I do not intend to prejudge the result of that trial, but my personal opinion is as indicated.

SEN. HICKENLOOPER: Do you believe that the Atomic Energy Commission is a primary target for Communist espionage?

MR. LILIENTHAL: I certainly do.

SEN. HICKENLOOPER: In case of doubt as to a clearance, do you believe it should be resolved in favor of the Government and against the individual?

MR. LILIENTHAL: I think the doubt should be resolved in favor of the country. Some individuals cleared by the Manhattan District to the very top secrets, had in their records allegations on which, had they been applicants for admission now, we would probably not have taken the same calculated risk. They have demonstrated great scientific capacity, have shown that they are presumably trustworthy, and in any case, are now the possessors of crucial information. In such cases, it seems wise to continue clearance.

SEN. HICKENLOOPER: Where substantial doubt exists and the individual is not essential, do you believe the doubt should be resolved in favor of the Government?

MR. LILIENTHAL: People have a different standard of what is substantial doubt. The Commission has set up a series of criteria.[2] I would like to stick to them, and not invent new ones in extemporaneous answers.

SENATOR HICKENLOOPER proceeded to accuse the Commission of having granted clearances to certain individuals, which he said he would designate by the letters A, B. . . . He said that this subject had been discussed with the Commission since July, 1947, but had not been satisfactorily resolved. He complained that, in the latter part of 1948, responsibility for clearances was largely decentralized into the field offices.

MR. LILIENTHAL: At earlier sessions, individuals were described in general terms, and those terms were then made less and less general, until it was perfectly clear who was meant. If individuals are going to be identified, they should be permitted a hearing. This may take time, but the protection of an individual's good name is worth it.

MR. LILIENTHAL then read a letter from the Commission, which said (in part):

> We believe that greatest care is required in public discussion of individual cases, to avoid serious consequences to the morale of all engaged in the atomic energy program. The difficulties of attracting and retaining competent people are greatly increased if people in the atomic energy program run a risk of undeserved injury to their good names which cannot be immediately redressed.
>
> The danger is not overcome by avoiding the name of the person. A description of the place where he is employed or work he is doing, may identify him as fully as if he were named. Vague clues may spread uneasiness throughout the project.

The letter pointed out that the Commission has continued to make available to the Committee, for perusal in executive meetings, the personnel security files of all its employees, even after the President's directive of March 13, 1948, prohibited the delivery of such files to congressional committees, without prior approval of the President.

SEN. HICKENLOOPER: This is not an attack on an individual. There is nothing in my mind except an attempt to indicate in illustrations what the system is doing to the security of the atomic energy program.

[2] See *Bulletin* V, (February, 1949), 62.

THE CHAIRMAN: I suggest that we go forward on Senator Hickenlooper's first case to find out just how he intends to develop it.

SEN. HICKENLOOPER: Mr. A. was given emergency clearance in August, 1947. In March, 1948, derogatory information contained in fifty single-spaced typed pages was developed by the FBI. In April, he was given a statement of charges and was suspended pending a hearing. In May, a hearing was held before a board composed of three Commission employees, a lawyer, and two scientists, which unanimously recommended clearance. The Director of Security interposed no objection.

None of the three members of the board had any background which would enable him to be called expert in security infiltration.

At the first meeting of the Joint Committee this year, an armed courier delivered to Chairman McMahon a document of which Mr. Lilienthal said: "This is perhaps one of the hottest documents that has yet been assembled."

Mr. Chairman, a man against whom serious doubt was raised, warranting suspension, a man upon whom there was a substantial file, creating serious doubt, was in charge of preparation of such a hot document that it had to be delivered by an armed courier!

MR. LILIENTHAL: This carries out my predictions. Senator Hickenlooper has identified the individual who is responsible for the preparation of the quarterly reports of the Commission.

THE CHAIRMAN: I would suggest that we recess at this time so that the Committee may come to some conclusion on this matter.

MR. LILIENTHAL: Charges and justice are two quite different things. On the basis of the inquiry there is no one I know of, and certainly this is true of me, who has the slightest doubt about the complete loyalty of individual A.

SEN. HICKENLOOPER: Only two people out of dozens who provided information to the FBI were called before the board.

THE CHAIRMAN: You and I have seen cases in which there have been thirty-five witnesses on one side and two on the other, and the jury believed the two.

REP. ELSTON: If I had not seen the name, I would not know who Mr. A. was. If the Committee is to consider these cases in executive session, the public is going to be deprived of information to which it is entitled. I

do not think they should be limited to the rosy speeches of Mr. Lilienthal.

THE CHAIRMAN: One-eighth of a trial in the open, and seven-eighths in secret, is not my idea of a proper assessment of worth of an individual.

REP. JACKSON: If the newspapermen in this room cannot figure out the name of case A, the newspaper profession is slipping.

On June 8, SENATOR HICKENLOOPER quoted from hearings before the Senate Appropriations Committee, in which Dr. Shields Warren said that he was "not competent in passing on Communist background," pointing out that Dr. Warren was a member of the Board which approved clearance in "Case A."

MR. LILIENTHAL: The assumption that only an intelligence officer has judgment about people is fallacious.

MR. LILIENTHAL then said that re-investigation of "Case A" was based on an anonymous letter, the author of which later stated under oath that he had no basis in fact to support his statements. Re-investigation was ordered, many months after a full FBI investigation had led to regular clearance.

SENATOR HICKENLOOPER produced a multicolored chart entitled "Personnel Clearance Procedure, First Phase, Decentralization," and complained of being unable to understand it. MR. LILIENTHAL admitted being puzzled by the "incredible" chart (prepared by a naval officer following an idea of Admiral Gingrich), but pointed out that, chart or no chart, the clearance system had operated satisfactorily on 70,000 applicants.

After this hilarious interlude, much time was spent on the elucidation of the trivial question of access to the building site at Argonne. The guards (who were ordered to admit freely a list of persons "and their guests" . . . *to all areas*) proved to be, not security guards, but employees of the construction company on a site not containing any secret installations. Nevertheless, the matter was discussed at length by Senators Knowland and Vandenberg, and the Chicago officials were congratulated on issuing a new memorandum to the company guards, making it clear that "all areas" did not refer to restricted areas outside their jurisdiction.

On June 20, SEN. HICKENLOOPER put into the record an article from the *Bulletin of the Atomic Scientists* on clearance cases, in which individuals were designated by A, B, C, . . . . He wondered why nobody objected to the use of initials by the *Bulletin*, while he was prevented from presenting his cases in the same way. The majority of the Committee was not impressed, and clearance cases were reserved for executive hearings.

## Foreign Distribution of Isotopes June 8 and 13

SEN. HICKENLOOPER: I would like to present to the Committee a serious breach of responsibility which includes potential impairment of our national security, a violation of the spirit and, I believe, the letter of the law.

This turned out to be the Commission's policy in sending certain radioactive isotopes abroad.

In the ensuing discussion MR. VOLPE quoted the pertinent sections of the law: Section 5(*c*) defines "by-product material" as any radioactive material (except fissionable material) yielded in, or made radioactive by exposure to radiation incident to processes utilizing fissionable material.

The Commission is authorized to distribute by-product materials for research, therapy, or industrial uses. No geographical limitation is set on this distribution (in contrast to the flat prohibition of the export of fissionable material).

Section 10(*a*) (1) says that, until Congress declares that the safeguards against the use of atomic energy for destructive purposes have been established, there shall be no exchange of information with other nations with respect to the use of atomic energy for industrial purposes.

Section 10 (*a*) (2) provides that, consistent with the assurance of common defense and security, dissemination of scientific and technical information relating to atomic energy should be permitted and encouraged.

There is no contradiction here. Congress wisely found that distinction could be made between industrial or military uses of atomic energy, and scientific progress and research. The Commission held that the distribution of radioisotopes belongs to the second category.

MR. LILIENTHAL: The history of the decision to send isotopes abroad dates back to January 15, 1947 when Colonel Nichols, Deputy to General Groves, wrote us, "It is recommended that the AEC approve continuance of the policy of making available to Canada and Great Britain isotopes on sale for off-project use in this country."

This was followed by a memorandum from Colonel Nichols saying that some twenty foreign nations have indicated interest in purchasing unclassified radioisotopes. Announcements by the Manhattan District have indicated that sales to foreign nations would be initiated after domestic requirements had been met. The Atomic Energy Commission might logically approve such sales provided the isotopes are surplus to U. S. requirements and are to be used for publishable scientific investigations or clinical treatment.

On January 30, 1947 a memorandum from Colonel O. G. Haywood said:

Certain radioisotopes may be directly or indirectly applicable to industry. None of them would directly assist in producing weapons or in utilizing atomic energy for industrial power purposes. Furnishing foreign nations with isotopes currently on sale would not furnish any information not declassifiable under the current Guides.

"In considering the release of radioisotopes some consideration might be given to the fact that many of the ores in which the Project is interested are located in foreign countries.

A memorandum from the AEC to the State Department on June 1, 1947 stated:

The Commission will not authorize foreign distribution of radioisotopes which would further the development of atomic energy for military or industrial purposes abroad. Foreign distribution will not be authorized for naturally radioactive materials or any newly produced element of atomic number higher than 92.

The program will not enable persons abroad to obtain information on classified production processes. 'Fission products' are excluded except for iodine 131. In plutonium separation iodine is evolved as a gas and its separation presents no technical problem.

The decision to distribute isotopes abroad was taken by the AEC on August 18, 1947, by a vote of 4:1, Commissioner Strauss dissenting. He presented in the June 8 hearings the paraphrase of his remarks:

Mr. Strauss stated that the record would not sustain the thesis that foreign scientists were all well disposed toward America; that many had worked for dictatorships, and that in politics scientist's views diverged as much as those of less-gifted men. He doubted the possibility of acquiring the good will of foreign scientists by authorizing the distribution of isotopes abroad.

Commenting upon the proposed safeguard, Mr. Strauss expressed doubt that it could prevent the use of isotopes for unfriendly purposes or their divergence into unfriendly hands. They could be useful as tools in biological warfare (mutation of biological warfare agents), in petroleum chemistry, and in metallurgical research (finding of alloys which could withstand heat and erosion in jet motors).

Mr. Strauss said that the applicability to the export of isotopes of the language of the Act prohibiting the exchange of information for the use of atomic energy for "industrial purposes" seemed clear to his lay mind.

In commenting on this document, ADMIRAL STRAUSS said: "I have not altered my views, and intervening events have fortified them." Later, he presented a memorandum enumerating actual uses of isotopes in industrial research.

MR. LILIENTHAL completed Admiral Strauss's story by quoting from the same minutes the opinions of Commissioner Waymack, Bacher, Pike, and himself:

Mr. Waymack said that by denying the foreign distribution of isotopes the United States will be giving unfriendly countries a propaganda weapon that might be more hurtful to national security than would be any possible harm in the release of radioisotopes.

Mr. Bacher pointed out that the Canadian pile is now in operation; the United States will want certain materials to be irradiated in that pile. He concurred with Mr. Strauss' point regarding European scientists, but believed that there is a struggle going on in Europe which is evident among scientific people as well as those pursuing other occupations. We stand to lose good will in places where we have had cooperation, if we continue to deny the distribution of radioisotopes. It does not seem to be in keeping with the foreign policy of the United States, which is to help those countries needing rehabilitation.

Mr. Pike pointed out that foreign governments must agree to make progress reports to the Commission, permit publication of such reports, and permit qualified scientists of any nationality to visit institutions where the materials are used. This would prevent misuse or divergence of the isotopes.

Mr. Lilienthal thought that the matter had been carefully weighed in the report, with the final conclusion that it is to the best interests of the United States to authorize the foreign distribution of radioisotopes at this time. Although there may be upsets in Europe, the Marshall Plan is designed to strengthen what can be friendly countries. The distribution of radioisotopes becomes a small part of the policy.

It was decided that the Commission's recommendation be forwarded to the Department of State presenting also the reasons which have been advanced against it.

MR. LILIENTHAL read the letter from the AEC to the Secretary of State on August 27, 1947, which said:

The Commission is of the opinion that the type of radioisotopes involved will not contribute to atomic energy research in other countries except to the extent that radioisotopes can contribute to any nation's general research program. The view may be taken, therefore, that to this extent their distribution is detrimental to this country's welfare.

It is the Commission's judgment, however, that the advantages the United States will gain from making available radioisotopes for humanitarian purposes outweigh this consideration.

Inasmuch as this matter involves questions of foreign policy the Commission requests the concurrence of the Department of State in this action.

The Secretary of State, in reply, said:

Based on your assurances that this offer does not prejudice our national safety, and in view of the safeguards set up in the distribution scheme, the Department of State sees no objection from the point of view of foreign policy . . .

On September 3, 1947, the President, speaking to the Fourth International Cancer Research Congress, said:

On behalf of the people of the United States, I am pleased to announce that progress in the production of radioisotopes now permits limited distribution to qualified research workers in other countries, principally for medical and biological research.

Commissioner Strauss did not abandon the fight: In September, 1947, I proposed that qualified researchers from countries which have agreed to support the United States proposal for international control of atomic energy be made welcome in our institutions to use the radioisotopes to further their medical and biological studies, and that in cases where isotopes were urgently required abroad for medical treatment, they be provided, where supervision could be supplied from our consulates.

He had a long talk on the subject with the then Secretary of War, Mr. Forrestal, apparently without finding support for his point of view.

SEN. VANDENBERG, the "father of the Military Liaison Committee", wanted to know whether the decision to send isotopes abroad was cleared with this committee.

MR. LILIENTHAL assured Sen. Vandenberg that a "remarkable unification of staffs" (of the AEC and the Military Liaison Committee) is "the most interesting development, managerially, in this enterprise."

## ISOTOPES FOR NORWAY

SEN. HICKENLOOPER refused to commit himself to Strauss' point of view that *all* isotope distribution abroad is against the law. Instead, he concentrated on one millicurie of radio-iron, allocated in May 1949 to the Norwegian Military Research Establishment at Kjellar.

He considered this as violating section 10(*a*) (1): the radio-iron was to be used for industrial research, and its shipment, therefore, constituted "dissemination of information pertaining to industrial use of atomic energy." A confused discussion ensued as to what the law meant by "atomic energy for industrial purposes." It appeared obvious to scientific witnesses that it meant production of atomic power for industrial purposes, and that the law prohibited the dissemination of information which could be helpful in building atomic power plants. In the interpretation of the congressional critics, and of Admiral Strauss, radioisotopes became "atomic energy" ("aren't they radioactive?") and also "information" ("isn't supplying isotopes a way of communicating information?"). Commissioner Strauss said that the type of metallurgical research leading to heat-resistant steel was exactly the reason which influenced his vote on August 19, 1947.

SEN. MILLIKIN: Radio-iron is a by-product of atomic energy, and the shipment is for industrial purposes. What is the use of experimenting with the distribution of molecules in iron and tracing them, if not for an industrial purpose? And why would a military establishment be doing it if not for a military-industrial purpose?

MR. LILIENTHAL: It would be helpful to have someone in the witness chair who knows what he is talking about.

THE CHAIRMAN: Would you volunteer, Dr. Smyth?

MR. SMYTH: It is difficult for me to act simultaneously as lawyer and physicist.

SEN. MILLIKIN: Do not hesitate. The lawyers go into the scientific field with equal stupidity.

MR. SMYTH: Speaking as a physicist, I would say that information about radioactive isotopes was not information about atomic energy or its use for industrial purposes.

THE CHAIRMAN: My interpretation is that there is no legal restriction on

the exchange of information about isotopes. I give it as a lawyer who has given some consideration to the Act.

SENS. MILLIKIN and KNOWLAND disagreed.

REP. ELSTON: When an isotope is transferred abroad, it contains information which might be useful for industrial purposes and if it does, it is a violation of the law.

THE CHAIRMAN: It is not atomic energy.

REP. HINSHAW: Here you have split off a piece of radiation in the form of energy, and if that is not energy, I do not know what it is.

MR. VOLPE: The definition of atomic energy in Section 18 describes the process used in the reactor. Therefore, atomic energy is the process within the reactor and not the by-product, radioisotopes.

SEN. KNOWLAND: There may be a loophole in the law that will need legislation to close up.

## DR. OPPENHEIMER'S TESTIMONY

The most interesting part of the discussion was on June 13, when Dr. Oppenheimer testified.

DR. OPPENHEIMER: The General Advisory Committee has been less equivocal on this subject than on almost anything else that has been referred to it. We told the Commission that we regarded their program as too conservative; we hoped that the export of certain fission products and of stable isotopes could be considered at a later date, but we were very glad that something was being done.

The purposes for which the Advisory Committee recommended the export of isotopes were basic research—not only in medicine and in biology, but also in physics, in chemistry, in metallurgy—and for therapy.

Let me turn to the use of isotopes in atomic energy development and in other military applications.

At Los Alamos we never made use of them.

Since the war I can recollect no application of these isotopes to the atomic energy program of sufficient importance to come to the attention of the General Advisory Committee.

No one can say that you cannot use them for atomic energy development. You can use a shovel for atomic energy development. In fact, you do. You can use a bottle of beer for atomic energy development. In fact, you do.

How about other military applications?

I have had a search made to see what use we have made of these isotopes in secret military research. The research defense effort in the United States is of another order of magnitude than any efforts in Western Europe, and I thought that we would probably find some cases where the National Military Establishment had requested isotopes for secret application to armament, jet engines, bacteriological warfare, or what have you.

To my astonishment, the staff of the Commission has come up with an answer that they have no recorded case.

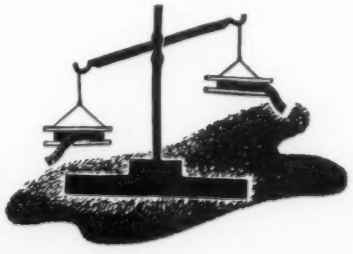
The next point is, that it is not within our power to deny these materials to Europeans. They are available in Western Europe, from the British piles, perhaps to a small extent from the French reactor, from cyclotrons, and from other accelerants. They are costly, but they are available.

Why, then, should we provide them at all?

If discoveries are made in Europe, we are in a better position to profit by them than the Europeans, because of our advanced technology, our good organization.

The positive arguments for making isotopes available lie in fostering science; they lie in making cordial relations with the scientists and technical people in Western Europe; they lie in assisting the recovery of Western Europe; they lie in doing the decent thing.

As to the Norwegian matter, my understanding is the following; it was shipped to a national defense establishment. This establishment appears to have two functions. It does military research. I do not know on what, and I do not know whether it is secret. It is also a contracting agency for the industries of Norway. The problem for which this shipment was desired was the study of the diffusion of iron into low-iron alloys. This is a basic problem in metallurgy which is being studied on an open basis at the Stevens Institute, Carnegie Institute, and one other place in this country.



Industry had an interest in the matter in order to improve the performance of turbines for the generation of water power. Dr. Cyril Smith, the metallurgist on the General Advisory Committee said that it fell within the intent of the General Advisory Committee's recommendations.

SEN. HICKENLOOPER: Would you consider the building of turbines, building for industrial purposes? And that, therefore, that information would be industrial information?

DR. OPPENHEIMER: I see what you are driving at. May I—

SEN. HICKENLOOPER: I do not care whether you see it or not, I am asking you a question.

DR. OPPENHEIMER: This is a basic research whose results will be valuable to industry. The Atomic Energy Act says that we should not transmit information abroad for industrial purposes. At the time the Act was written you had been exposed to testimony from characters like me, that you could not have industrial atomic energy without danger of great military resources.

The interpretation which the laity have made of this provision of the Act is; do not let us help any other country to get industrial atomic power because, if we do, we will at the same time help them to be getting atomic weapons; but it is certainly not possible to take the prohibition against helping other nations industrially, literally; because everything we do is contrary to it.

SEN. VANDENBERG: When the Atomic Energy Commission confronts for the first time a shipment of isotopes abroad to a military establishment, would you not think it was elementary prudence to ask for advice of the Military Liaison Committee?

DR. OPPENHEIMER: The main function of the Military Liaison Committee are not the negative ones of guarding secrets, but to be sure that the Atomic Energy Commission knows what it needs to do to increase the military strength of this country and that the services are prepared to take advantage of every new development which takes place in the Commission's laboratories.

It is in the light of the enormous number of problems that arise in this area, that you would have to see whether the referral of a specific case of isotope shipments should have been made.

SEN. KNOWLAND: Would the French pile be in a position to supply substantial quantities of radioisotopes?

DR. OPPENHEIMER: If concentrated on one specific objective, it could have given the Norwegians several millicuries of iron, but it could not have done that at the same time with other things, as we do.

SEN. KNOWLAND: Assume that any country, by the use of radioisotopes, could discover a better way of making steel that would stand high temperatures, which ultimately could be translated into the building of a better type of jet engine. Would not the knowledge be of tremendous value in the military defense of any nation?

DR. OPPENHEIMER: Such a discovery would be of very slight use to the Norwegians and of enormous use to us, because the ability to use basic information is a question of the vigor of your technology.

History again and again shows that we have no monopoly on ideas, but we do better with them than most other countries.

## General Advisory Committee's Statement on AEC's Competence

In answer to an inquiry by Representative Holifield, Dr. Oppenheimer read a Statement of the General Advisory Committee:

The General Advisory Committee has followed the scientific and technical activity of the Atomic Energy Commission since January, 1947. We have seen at first hand the grave difficulties which the Commission faced in assuming responsibility for an extremely complex enterprise which had been disrupted by the ending of the war and by a year of uncertainty pending the establishment of the Atomic Energy Commission.

When the Commission took over, the future of the whole enterprise was uncertain. The continuity of production of fissionable materials was far from assured; the design and development of improved weapons was nearly stagnant. In each of these respects the picture has radically changed.

Better weapons have been developed and tested; the production of materials has been substantially increased and has been assured, and a sound and forward looking program has been established.

There have been occasions on which the Advisory Committee has criticized the Commission and offered suggestions for the improvement of its program, which suggestions have largely been followed.

In all of our examination of the Commission's activities, we have seen a frank recognition of the problems of management inherent in any new undertaking, and a steady progress in their solution.

The improvement which has been achieved during the Commission's administration appears to us to offer clear proof of a competence and devotion to duty of the Commission.

SEN. VANDENBERG: Is that presumed to include an evaluation of security?

DR. OPPENHEIMER: It is based on our knowledge of the scientific and technical aspects of the work. Some parts of security are scientific and technical, for instance, declassification, the sending of isotopes abroad; these aspects are included. Personnel security or guarding is something of which we have no first-hand knowledge.

REP. JACKSON: Would you care to comment on the present caliber of the laboratory at Los Alamos?

DR. OPPENHEIMER: During the war we had the best laboratory in the world there. But I think that it is generally regarded by my colleagues that Los Alamos is the best federal laboratory and the best laboratory working on a military job that there is in the country now.

REP. JACKSON: I wonder if you would care to comment on the security program of the Commission.

DR. OPPENHEIMER: I think the Commission has had a very, very difficult time reconciling the provisions of the Act and the needs for reliability on the part of its personnel with the kind of freedom and spontaneity which is required if real progress is to be made. My feeling is that the Commission has sweated blood over that one and come out with about as good an answer as it is possible to get.

REP. JACKSON: Are you satisfied as a whole with the program and management of the Atomic Energy Commission?

DR. OPPENHEIMER: I am. As a member of the Advisory Committee, it is my job not to be satisfied. Here it is my duty, and my pleasure, to be satisfied.

THE CHAIRMAN: Are you satisfied with our weapon progress?

DR. OPPENHEIMER: It is my business to find points where it should be criticized. But it is far better than I thought it would be.

SEN. HICKENLOOPER: Had not the basic design of the new weapons been developed under the Manhattan District?

DR. OPPENHEIMER: Some features of the weapons tested I asked General Groves to let me incorporate in the bomb that did not go to Japan because the war was over. Other features we did not then know how to realize, though we knew that we ought to try.

SEN. MILLIKIN: I remember when we were having our hearings, many scientists were willing to make a world-wide dissemination of the whole subject, in theory and in practice. That gave me the impression that scientists were not as conscious of the security angles as the rest of us were.

Are the scientists willing to adjust themselves to the necessities of that until we get this world fixed up for peace?

DR. OPPENHEIMER: I think that there are a lot who are. There are many who keep out of the atomic energy business. There are some who are not today ready and who may be willing to do it in the future. But I think all of them would address to you the plea that you proceed with the business of getting the world fixed up for peace.

THE CHAIRMAN: To my recollection, there was no scientist of repute on in 1945, or in 1946, who took the attitude that there should then and there be world-wide dissemination of the information about atomic energy. There were a few crackpots, but we have those in every profession. I think it is important that the people of the United States understand that this responsible, most valuable element of our community did not take that position.

DR. OPPENHEIMER: I am glad you said that, Senator. I think that scientists are no different than any other people. They want a world in which they can be free.

SEN. MILLIKIN: I recall very well I had a pet question that I asked every witness, as to whether they favored doing what they wanted to do prior to the time that we got the world—my phrase—"postured for peace."

THE CHAIRMAN: My recollection is that scientists discussed methods by which international control of atomic energy could be accomplished. They participated in the formation of our international policy. These men probably appreciated more than we could the terrible problem that had been raised, and their belief was that atomic energy must be effectively controlled if there is to be permanent peace in the world.

REP. HOLIFIELD: Could not management of security be separated from business management?

DR. OPPENHEIMER: The art of management in a job like this is to retain security and still to get some work done.

The danger of two organizations, one of which says no and the other, yes, is that they are in constant deadlock. The best security is that of the grave. And the cure for the disease which you have brought up, namely, a morbid preoccupation with the Commission's stewardship of security, seems to me to lie in a better perspective on the part of all of us as to what security is, how important the alleged lapses are, a perspective in the light of which most of the preoccupations of the past years will appear to have been addressed to the wrong problem.

## The Plutonium Fabrication Plant
## June 15

SEN. HICKENLOOPER introduced this subject by reading from the Report of the Appropriations Committee of the 80th Congress:

"The Committee is not satisfied with its relations with the Atomic Energy Commission.

The Commission's refusal to furnish information because of the secret character of the work involved, leaves much to be desired in establishing confidence.

There is some feeling that the Commission has taken advantage of its strategic position to avoid facing realities on less important elements of their budget. The impression left is one of general extravagance."

Now, from the report of the Appropriation Committee of the 81st Congress:

"In recommending a reduction [of about 7 million] for the community program, the Committee is of the opinion . . . that the cost of town operations is excessive.

In 1950 the Commission proposed to pay to the various universities, in the form of fellowships and contracts for research, $23,368,000. The Committee recommends that a substantial reduction be effected in this program."

MR. LILIENTHAL: The Appropriations Committee intended not to reduce funds for the production of weapons. However, they took $45 million from the item, "Source and Fissionable Materials," which includes procurement of uranium and the production of fissionable materials that go into weapons.

SEN. HICKENLOOPER: Would you say that the House Appropriations Committee just did not understand what it was doing?

MR. SHUGG (Deputy General Manager): We may not have made that program properly clear to them. The House says that weapons and reactor development is only one-third of the AEC program. Source and fissionable materials, which is necessary for weapons, plus weapons and reactor development is 79 per cent of the budget.

THE CHAIRMAN: Are we now ready to take up the Hanford Project?

SEN. HICKENLOOPER: A board was appointed by the Commission on March 12, 1949, to examine Construction Project 234-5 at Hanford. It was marked "Secret." It was my incompetent opinion that it contained no classified information. We discussed this with the Commission, and they agreed that this report could be used.

An authorization for this work, estimated at $6,255,000 was issued in 1947, and completion was set for April 1, 1949. On February 9, 1948, the General Electric Company revised the estimates to $10,432,000. On March 12, 1948, to $11,933,900. On July 12, it was reduced to $8,230,959—the reduction resulting from elimination of a portion of the work.

In January, 1949, estimates jumped to $25,219,000.

The Commission's own reviewing board stated that lack of planning and mistakes in changing decisions added to the cost.

A ventilating system, when ready, was found not to fit. The roof was raised, and still it would not fit; a new building was constructed to house it.

The report attributes responsibility for the AEC to Mr. Shugg and Mr. Williams—one of the authors of the report.

The Board believes that "such a mistake can be attributed only to a lack of capacity on the part of the company at Hanford to handle construction projects of this magnitude or a lack of concern for costs, or both."

THE CHAIRMAN: They do not seem to have been easy on themselves, Senator.

SEN. HICKENLOOPER: I compliment these men in making a highly critical report in which they themselves have been involved.

REP. PRICE: They were appointed by the Commission, Senator.

SEN. HICKENLOOPER: Because of a lack of proper organizational setup this tremendous overrun was not brought to the attention of the Commission until one of the Commissioners on a routine inspection discovered this matter. I think it goes directly to the question of maladministration, of failure of a proper accounting method.

"These costs can be judged," the Commission is now saying, "only in the light of circumstances. The overriding consideration was earliest completion of this installation because of its relation to the result of the 1948 Eniwetok tests."

This project was conceived early in 1947. How the Commission can excuse this matter on the Eniwetok tests is beyond me.

REP. PRICE: I think even I could answer that.

MR. LILIENTHAL: I hate to keep on pulling rugs out from under the Senator. A long time before the Eniwetok tests were held there was good reason to believe that they would be successful, although the new weapon designs were rather daring.

In order to promptly take advantage of the test results, the Commission had to be ready with facilities for refabrication of the nuclear components.

The activities for which this facility was designed had been carried on at Los Alamos, largely by scientists. For security reasons, and because it was unsound to continue operating a production line with scientists, a second facility of different design was desirable, which could be operated by production men.

We put the heat on the General Electric Company. The plant is there, in time to help us to increase our stockpile.

If I may come back to this report of the Board, consisting of the Commission's Director of Production, General Counsel, and Controller, I think it is a wholesome thing, and not evidence of mismanagement to have people put on hairshirts and criticize themselves and everybody else; but it is not the way to improve the relations between Government and the General Electric Company to have a big microphone out in front of the Commission every time we criticize each other.

That this undertaking is *owned* by the Government is inevitable; if there had been any alternative, I am sure Congress would have chosen it.

But there is an alternative to direct Government *operation*. Get the best industrial talent willing to live under the conditions of this enterprise. The General Electric Company is willing.

One of the great assets of this country is the existence of such companies, and some of them are contractors of this Commission. "Contractors" is not the word; they are partners; they are operators.

We are trying to develop a new kind of setup in industrial affairs, a hybrid of public and private; and it is good if the public does not sit on the necks of the private, or the private is not completely unaware of its public responsibilities.

The alternative is that every step taken by the operator should be checked by Government supervisors. This we do not believe is right.

Last September, at Hanford, Senator Hickenlooper questioned General Electric Company staff as to whether the Commission was not a hindrance to the Company, and whether the Commission's staff was not unnecessarily large. These were proper and pertinent questions.

SEN. HICKENLOOPER: Whatever criticism may be directed at the General Electric Company, I have not directed it. It has been directed by the Commission. On February 23, 1949, Mr. Schlemmer (Hanford manager of the AEC) wrote to Mr. Prout, of the G.E., disapproving the request for additional expeditures, and requested immediate cessation of all work not essential to Phase 1. It is a three-phase operation. It was the completion of three phases which would cost $25 million.

MR. LILIENTHAL: Completion of Phase 1 permits the operation of a unit.

REP. ELSTON: You say in your release that "plutonium is a deadly material." Did it become more deadly when the estimate got up to $25 million?

MR. WINNE (Vice President, General Electric Company): The construction at Hanford has embodied a great deal more than this project.

From July 1, 1947, until April 30, 1949, 65 major construction projects have been initiated; all are now completed or nearing completion. Our initial estimate was $230,602,000. The indicated actual cost will be $237,167,000. If we subtracted the 234-5 project, we would be 8 million under the estimate.

The 234-5 facility is for the refining and fabrication of plutonium metal. When the design was started, it was believed that there could be permitted one part plutonium dust in $2.5 \times 10^{12}$ parts of air.

To offer a margin of safety, the plant was designed so that it would not exceed one part in $5 \times 10^{13}$. With the installed equipment we are able to get down to one part in $10^{14}$, and that is what today is considered a safe margin. Had we not put in the additional factor above what was thought safe at that time, we might have had today a plant which we would have to rebuild, at a cost in excess of $24 million.

SEN. HICKENLOOPER: The report says: "It appears that the project had been worked up on the basis of"—a certain capacity— "on a single-shift 40-hour week. A plant of smaller capacity operating on a three-shift basis would have been given consideration had there been any indication that the $6,350,000 estimate was too low."

MR. WINNE: This plant has use beyond the weapon project, to form parts for power piles. The size of the plant could have been decreased very little even had we attempted to lay it out on a three-shift basis.

REP. JACKSON: Has a building of this kind ever been built before?

MR. WINNE: The building is not too unusual; it is the facilities within, the tremendous ventilation, the filtering, not only of the incoming, but especially of the outgoing air. The walls and doors even, are somewhat different because of provisions for ready decontamination in case any room gets contaminated. Many changes had to be made as we went along. The ventilating equipment had to be increased many times, and remote operating equipment had to be revised.

Our understanding was that the urgency was extremely great throughout the construction. Many times construction was almost ahead of the design. The project is now completed, insofar as Phase 1 is concerned. It is now going into operation. We think it is worth its cost.

SEN. HICKENLOOPER: I do not care to pursue this matter of design change. I know nothing about engineering. I am criticizing administrative procedures, and I have no questions to ask Dr. Winne.

THE CHAIRMAN: There is no allegation here of any misfeasance. Senator Hickenlooper's allegation is that this overrun was made without the knowledge of the Commission.

During the war we built the thermal diffusion plant at Oak Ridge which cost, I believe, almost one hundred million dollars, and it ran a week and we tore it down. That was just one of the operations we hoped would be fruitful, but it was not.

SEN. VANDENBERG: Dr. Winne, this is hardly an ordinary cost-plus contract?

MR. WINNE: Cost plus one dollar. The General Electric Company is guaranteed against loss, but it is also guaranteed against profits. We receive from the Government a monthly payment of $200,000. That has been considered by many as a profit to the General Electric Company.

It is not a fee. It is an administrative fund against which we make such charges as we can justify as actual expenditures.

Our only profit is on electrical equipment which we may supply on a competitive basis. We have received orders for about 50 per cent of such equipment, and we might reasonably expect to obtain that amount even if some other firms were operating Hanford and Knolls.

## Announcement

The *Bulletin* has a more extensive report on the AEC investigation, from which the final condensation printed in this issue was prepared. It contains much additional information on subjects only briefly touched upon here, such as the community management at Oak Ridge, Hanford, and Los Alamos, construction programs, security clearances, etc. If enough of our readers are interested in receiving copies of this report (about 250 pages), we will mimeograph copies and sell them at cost (not to exceed $1.00). If you are interested, please write us, or fill out this coupon.

I am interested in receiving a copy of THE AEC INVESTIGATION

Name .....

Street Address .....

City ..... Zone ..... State .....

# The Loss of Uranium at Argonne June 16

SEN. HICKENLOOPER: According to my understanding, on September 16, 1948, some enriched uranium was transferred to another vault at the Argonne National Laboratory. In February, 1949, the vault was opened, and the material was not there. The container was not found, and the material was not located.

The FBI was notified late in March. On April 27, the Joint Committee was advised. In an executive meeting with Dr. Zinn, Director of Argonne National Laboratory, it was emphasized that the missing material had been contained in a brown laboratory bottle. A duplicate bottle was produced.

A week later, after a search of a dump, the Committee was told that the bottle had been found. I asked for full report and found that what was found was a clear Ball Mason fruit jar.

I am utterly mystified. I am unable to find any evidence that this *was* the missing bottle. Approximately 4 grams of U-235 are still unaccounted for.

THE CHAIRMAN: I do not recollect having denominated this bottle by color.

SEN. HICKENLOOPER: The press quoted the Chairman as saying that the brown bottle had been found.

THE CHAIRMAN: If that is what the press reports, I am sure that it is accurate. However, one of the reporters shakes his head, so his recollection must be different.

REP. DURHAM: In looking through the minutes, I do not know where this bottle got the brown color.

SEN. HICKENLOOPER: Dr. Zinn will admit that he brought a bottle of brown color.

THE CHAIRMAN: He did not.

DR. ZINN: I did not.

This bottle came to my attention when the agents of this Committee, Mr. Heller and Mr. Borden, were in Chicago.

I saw Mr. Heller going with someone to a stockroom saying, "Let's get a bottle like it," and they came back with a brown chemical bottle. It was his idea to bring it to Washington. I do not think we had, at the time, categorical statements from anybody that the missing bottle was brown.

May I describe the finding of the bottle? The Senator will see that it was identified not by its color.

THE CHAIRMAN: It would be better if you give us the whole story of the loss. The Committee has heard it in executive session, but the public has not.

## DR. ZINN'S STORY

DR. ZINN: The Metallurgical Department at Argonne normally works with unenriched uranium, not in grams, but in hundreds of pounds, and even tons.

Because of an urgent need for an experiment, they were asked to do fabrication work on a sample of enriched uranium.

THE CHAIRMAN: I assume that you are keeping in mind classification.

DR. ZINN: I am, sir. I am not going to mention enrichments, for instance.[3]

In this fabrication they produced the finished articles, and also certain debris, machine turnings, and so on. This material was stored in their vault, next to a large quantity of natural uranium.

One sample was in a steel box. Another, a solution, in a graduated glass. A bottle contained the machine chips, and another ashed filter paper.

The Special Materials Department ordered all these materials to be transported to a central vault, which had only enriched material in it.

It is fairly certain now that the packer left one bottle behind.

Bookkeeping for enriched material is difficult. At that time, it carried only the total amount of enriched uranium and did not show how this amount was determined. The man who did the packing was not capable of understanding the figures well enough.

SEN. KNOWLAND: Did the man who received it understand it?

DR. ZINN: It was going to dead storage. They did not make a physical inventory of the material. This is a hole, which by now, we have plugged.

SEN. KNOWLAND: When was the loss discovered?

DR. ZINN: On February 7, when a special materials man checked the material in this vault against his figures.

SEN. KNOWLAND: Approximately five months after the shipment had arrived?

DR. ZINN: Yes, sir.

In the machine shop there is a problem of the recovery of waste uranium oxide, or machining chips, which must be handled carefully because of a certain hazard.

Employees collect this waste, in a prescribed way, into high-quality garbage cans. It is stored in the vault, until shipped to a recovery plant.

When the bottle was in the vault, these cans with used material also were in it.

In this Laboratory there are tons of normal uranium. Here was a little material that looked like uranium; it *is* uranium by all ordinary tests. If it had gotten mixed up with ordinary uranium, it could only be detected by mass spectroscopy, and we do not make mass spectroscopy analyses. This requires a special laboratory.

While we began the search for the original bottle, we also investigated the possibility of its contents having been mixed up with unenriched uranium. The bottle itself just did not seem to exist. But one of the special-materials men remembered that we had in storage, waiting for shipment to the metal recovery plant in Philadelphia, twelve galvanized iron cans with uranium debris. Could our material have gotten into one of these cans?

Physicists suggested that we make a very sensitive enrichment test right at Argonne by putting a small sample into the pile, getting it out again, and making certain measurements on delayed neutrons. All twelve cans were sampled, by what we call "thief sampling"—four or five samples from each can. Among these samples tested around April 12, one had four times the normal content of U-235.

This does not come about by accident. Enriching uranium is a difficult art.

We dispatched recovery can No. 3 to Oak Ridge, where there are facilities for recovering enriched uranium, and for analyzing it by mass spectroscopy.

We were sure that we *had* enriched material. We did not know *how much*.

On May 19, Oak Ridge wrote us that 27.31 grams of U-235 were found in this can. What we missed was 30 grams.

[3]This information was revealed by Senator Hickenlooper in his press release accusing Mr. Lilienthal of "incredible mismanagement," (see *Bulletin* V (June-July, 1949) 182.

THE CHAIRMAN: Oak Ridge did not know the story behind the sending of this container?

DR. ZINN: They did not.

## The Missing Bottle

I would like to go on now to the missing bottle. Mr. Heller and Mr. Borden arrived in Chicago. I saw them at noon, May 20, and they said: "The bottle in which the stuff was is a vital point." There were a number of us at the table, and we began to surmise what would have happened to this bottle if its contents were emptied into the recovery drum.

The label on the bottle probably did not show that it contained enriched material. This was a hangover from the war days when we were careful not to give away that we had enriched material. There is no valid reason for this any more—but it was still practiced.

THE CHAIRMAN: That is classified as top secret?

DR. ZINN: Well, the classification of such things is going down with time.

THE CHAIRMAN: But it has never been declassified, has it?

DR. ZINN: Not that I know of.

If this bottle did not carry an enrichment statement on it, the man who emptied it thought it was normal uranium. He would be following laboratory practice if he put the empty bottle in what we call a "dry active waste container."

This may startle you, but in laboratories which deal with radioactive materials, you never re-use glassware; it is used once, and then, I am sorry to say, must be destroyed.

The active waste containers are picked up by a special crew, monitored by the health physics people, and then the material is emptied into what we call a burial vault—a steel box six feet high, ten feet long, four feet wide, set in the ground, and containing about eight tons of waste material.

Mr. Borden asked, could we not dig up these active waste vaults. I explained this was hazardous.

Mr. Borden and Mr. Heller left on Saturday noon.

During Saturday night and Sunday, I became convinced that the bottle was emptied during the month of November, 1948.

We knew already that recovery can No. 3 had been shipped from the vault on November 29, 1948.

On Sunday, I asked: "What kind of can was this?" I was told it was a 10-gallon one. I asked, "Did you always use 10-gallon cans?" They said, "No, we used to use 30-gallon cans." I asked, "When did you change from 30-gallon to 10-gallon cans?" I got the usual answer, "I don't remember."

I got the stockroom people to work, and their record showed that the custodian of the vault up to October 1, 1948, requisitioned only 30-gallon cans. October 1 he got two 10-gallon cans, and three 30-gallon cans. October 12th, he switched completely to 10-gallon cans. This suggested to me that after October 12th was the time to think about.

Another point was that two of the twelve cans contained large amounts of extraneous material, including water, and No. 3 was one of them.

I found that there were two incidents which could explain the water. On February 28 there was a fire in one of these cans. That was *not* can No. 3.

In the other incident, a leak had occurred in a cooling water line at the rolling mill. People remembered that it was around Thanksgiving.

I came to Washington on Sunday, and the next morning I directed by telephone that Chicago should get to work exhuming, under supervision of the FBI, the burial vaults filled during November, 1948.

On Thursday morning, Dr. Thiele (Special Investigator for the Committee) had come to Argonne, and we went to lunch, and on the way back, I said, "Would you like to see this burial vault in which we are trying to find the material?"

## The Exhumation

We went, and the FBI man who was there said, "I have something very interesting here."

He showed me a bottle, a Mason jar, and he asked me to look at the label. The label carried legibly at that moment one number, "284.0 grams," which I recalled immediately as having seen on a document transferring the lost bottle at an earlier time for analysis of its contents.

I said, "I believe we should look much harder at that label."

He brought it over to my office. He and I and several others looked, and we began to see other things on the label. It had been drying out, and more numbers became visible.

We called the chemists who had weighed the material in this bottle, and asked, "Do you recognize it?" Some answered, "Well, I have seen lots of bottles like that," but one man looked and said, "Why, that is the weight, 289.2 grams, which occurs on the document transferring it from my analytical laboratory to the metallurgical division."

Furthermore, he said, "That is my handwriting."

Inside the bottle there were traces of material. Our microchemists analyzed it that same evening.

The FBI, the AEC security people, the Deputy Director all went along. There were, you might say, a crowd that observed that analysis. It was done extremely carefully. Next morning, we had also a mass spectroscopic analysis, and an enrichment analysis was also made by the new way worked out in our laboratory. Both gave enrichments agreeing with what we supposed was in the bottle. There was no other sample in the laboratory of that precise enrichment.

This, to my mind, identifies the material without question.

## The Numbers on the Label

Now, I should say what all was found on this bottle label. This is a letter from J. Edgar Hoover to the AEC, and I believe it is appropriate——

I have just been told by this gentleman here that it better not be read into the record. I understand that you do not do that with FBI reports.

To complete the story, more must be said about the numbers on the label. The number 284.0 grams exists on a transfer document from the Metallurgy Division to Mr. Fields, the analyst.

Mr. Fields later sent it back, and here is his document giving 289.2 grams as the weight. He consolidated two items.

Mr. Paxman (the FBI man) made strenuous efforts to find who had written the other number (284.0 grams). He found that it was Mr. Dunsworth. Mr. Fields and Mr. Dunsworth both are here today.

One notation on the bottle puzzled us. It was only partly legible. You could see 7.3 per cent and right after it, $U_3O_8$. What could it mean?

Mr. Paxman talked to various people, and came back to me, and said, "I have a very reasonable explanation of what this 7.3 per cent $U_3O_8$ is."

When he had completed telling it to me, I said, "There is no question that your explanation is correct."

Mr. Fields had determined that of the material in the bottle, supposed to

be $U_3O_8$, 82.3 per cent was uranium. If you have pure $U_3O_8$, the percentage of uranium depends on enrichment. If it is normal material, it is 84.8 per cent. If it is pure Uranium 235, it is 84.6 per cent. It is a custom among chemists handling enriched material, no matter what the enrichment, to use 84.6 and not 84.8.

If you take the 82.3 per cent measured by the analyst, and divide it by 84.6, you see that the sample had 97.3 per cent of the amount of uranium, which should be present if it were $U_3O_8$.

This technical point may seem involved, but to me is very convincing, even though the "9" has to be imagined in front of the "7". The label was torn so the "9" was not visible.

SEN. HICKENLOOPER: Is it possible that there might have been a "1" in front of the "7"?

DR. ZINN: I cannot think of any number in this business which has 17.3 per cent connected with it.

The FBI agent is convinced that if anything, it is a "9". He is the man who dug up this thing of the 97.3. I think it was a fairly good feat of deductive reasoning. By the way, he is a mathematician by training.

This represents my story of the identification of the bottle. To me, it is conclusive evidence.

THE CHAIRMAN: What are the results from Oak Ridge at this time?

DR. ZINN: We have had only one letter around May 18. It said that they have recovered 27.31 grams of U-235.

Our analysis indicates that probably there was 30.80 grams of U-235 in the bottle. This leaves a discrepancy of 3.49 grams.

There were some points in the recovery operation that were not completely satisfying and are being worked over by Oak Ridge. They have not given us any answer yet. Yesterday morning we have gotten from them a sample of the solution they made out of the material in the drum.

Naturally we put our laboratory to work to check their analysis. Oak Ridge said that the enrichment is 1.33 per cent. We find 1.40 per cent with a method every bit as precise as theirs.

SEN. HICKENLOOPER: The Oak Ridge people were very confident, based on their long experience, that their analysis was very, very accurate.

DR. ZINN: I have no proof that the Oak Ridge analyses are wrong. I am trying to point out that they are difficult, and that to say that 3.49 grams are definitely not accounted for is not really possible.

## The Spy Theory

THE CHAIRMAN: Without imputing it to Senator Hickenlooper, there are those who cling to the theory that some spy ran away with this 3.49 grams.

DR. ZINN: The FBI never told me about any evidence that the vault was broken into.

Now suppose it was an inside spy, why would he dump most of the stuff into a drum and keep a little bit of it?

There is a much simpler way of making it very difficult ever to know that something funny had happened, and a person who knows as much about the business as this person apparently did—I just do not understand why he would do it this way.

SEN. HICKENLOOPER: If anyone wanted to surreptitiously remove three or four grams of enriched material it might be perfectly natural for him to take a little bit, dump the rest in the waste can, put the bottle where it was normally supposed to be, feeling that a check would disclose the bulk of it, and the bottle perhaps eventually found, and people would say, "That is the explanation for it."

DR. ZINN: I cannot agree, Senator, that that is perfectly plausible. A little on the fantastic side.

SEN. HICKENLOOPER: If he took the whole bottle, and it completely disappeared, there would be more of a hullabaloo.

THE CHAIRMAN: I doubt it.

REP. PRICE: How could there be?

DR. ZINN: The Metallurgical Division had been scheduled to move about January 1. When you move, you get an extra amount of recoverable material, and, therefore, the AEC people said, "Let's hold the recovery cans until we get Metallurgy moved." Otherwise, they would have shipped them out a couple of months earlier, and we would not have had any chance of making this analysis.

## Difficulties in Accounting for Materials

THE CHAIRMAN: The tests that you have told us about, do they make it entirely feasible that the missing portion is involved in laboratory work?

DR. ZINN: I believe it is entirely possible.

THE CHAIRMAN: Many people cannot understand why it is so difficult to keep an inventory of materials. They think it is like money. You put it in the bank, you count it, the teller counts it, he receipts for it, and it is perfectly identifiable.

Will you give us a brief explanation as to the difficulties involved in the inventory?

DR. ZINN: There is only one way of keeping your material so that the number you carry on your book stays constant and that is to put it in vaults and never touch it. Whenever you work with it, you get uncertainties.

Let me give an example.

The Battelle Memorial Institute in Ohio has been manufacturing certain metallurgical specimens. We said, "We need specimens like that made with enriched uranium."

We shipped to them from the stockpile a certain quantity of enriched uranium. They used this to fabricate a dozen objects. They shipped to us the objects they made, plus five other lots of material, machine turnings, powder, debris, floor sweepings, wiping rags, wash solutions, a whole mess.

We have a slip that shows the amount of enriched uranium they received. How do you find out whether it is still there?

You take the rags, the cleaning solutions, the chips, the powder, the sweepings, and send them to Oak Ridge to recover uranium.

But you still will not know where you are, because you don't know how much is there in the objects they fabricated for us. If you dissolve those to analyze them, you have lost what you made.

These metallurgical samples are scheduled to be irradiated in reactors. They will become radioactive. For them to cool to a point where chemists can work on them will take years. And yet, we will not be able to balance the books; we will never know what we have to write down as loss in this fabrication until these samples have been analyzed.

If during the fabrication, a small amount of material was purloined, we do not know it now. We cannot know it without destroying the whole experiment.

SEN. HICKENLOOPER: Four grams of this material is an important sample for scientific investigation?

DR. ZINN: As time goes on, the amount of material which you should consider important gets larger. We cannot expect that other people do not, by well-known means, make some of these ma-

terials themselves. We must be careful not to try to make too much effort to protect too little.

If we are dealing with espionage, certainly, we have to worry about the materials. I worry much more about our numbers, about the measurements we make with these materials. We have skills and ways of making measurements which probably are not current in other places, and numbers, when they leave, do not leave any trace.

THE CHAIRMAN: Doctor Thiele, as a result of a request by the Committee, did you conduct an investigation of this reported loss at Chicago?

## DR. THIELE'S TESTIMONY

DR. THIELE (Assistant Director of Research, Standard Oil Company of Indiana): Yes, sir. The first question was to find out how much Uranium 235 was in the bottle which disappeared.

I do not have much to add. The scales used were accurate. The analysis was done by a suitable method so that the figure, 82.3 per cent uranium, is probably a good figure.

The isotopic composition can be checked because there was reserved a small sample from the same batch. It has since been analyzed and analyses agree with the supposed composition of the billet. Consequently, the weight of missing U-235 must have been very close to 31 grams.

The waste can in which the enriched material was found, was sampled first at Argonne, and one of five samples, together with the original can, was sent to Oak Ridge.

The material was not all brought into solution. Samples had been taken; an attempt was made to bring them to solution, but there was a residual solid. The samples taken at Oak Ridge, the sample sent from Argonne, and two large lots, one of solid and one of solution, were all analyzed.

The analyses should be good with one exception: I considered that the method used for the isotopic analysis of the solid was open to objection. The Oak Ridge people made preparation to repeat it. The discrepancy depended very largely on the analysis of the large bulk of solution. I suggested that they should make another analysis of this material, too, and send a sample back to Argonne. As Dr. Zinn said, the analysis made at Argonne was considerably higher—outside of the limits of error which the people at Oak Ridge had suggested.

There is another point. To determine how much U-235 came from the bottle, the assumption has been made that the rest of the material in the can was normal uranium. It turns out, however, that in October they were working up in the metallurgical department at Argonne some *depleted uranium*, from which nearly all of the U-235 had been removed.

This billet was machined into blocks, and records show that 810 grams were lost as chips. While the first block was further fashioned, an explosion occurred on October 22 which caused the block to be useless for further work, and it, too, was scrapped. In all, there were scattered, among the scrap uranium of normal composition about 1500 grams of depleted material. This was in October.

One can of waste was taken out at the end of that month, and can No. 3 was taken out at the end of November. Depleted uranium may have found its way into this can.

SEN. HICKENLOOPER: Would it not have gone into the October can?

DR. THIELE: Yes, but we cannot now find out how they dealt with the material on the floor. We have as yet no evidence of the presence of depleted uranium in can No. 3.

Of the 12 cans, only can No. 3, so far, has been analyzed, but they are working on the other 11. From their isotopic analyses, we may, perhaps, get an idea of where the depleted uranium is.

There are also the additional four "thief samples" taken at Argonne. They have been examined only by a very inaccurate method. The six "thief samples" analyzed at Oak Ridge showed either normal composition or an excess of Uranium 235. It seems worthwhile to get an isotopic analysis on the remaining four, in the hope that some depletion could be found.

THE CHAIRMAN: Dr. Zinn, did you tell us about the $20,000,000 error on gold at Fort Knox?

DR. ZINN: It is a well-known story. If you weigh all the gold there, your probable error is something like $20,000,000. That illustrates the difference between accounting and measuring. A 25-cent piece is a 25-cent piece, no matter how much it is worn, until it is discarded, whereas, in this material, every time you handle it you change its value.

SEN. HICKENLOOPER: The methods used to determine these highly important atomic matters are much more delicate than the arrangements for weighing big blocks of gold?

DR. ZINN: The relative error is not too much affected by the weight. When you get down to milligrams, it goes up. The balances are best when the weight is a fraction of a gram.

The unfolding of the U-235 loss story was concluded at this point, leaving the tracing of the still missing four grams of U-235 to further scientific sleuthing, but with all air of mystery and dark suspicion of foul play utterly dissipated.

## LEAKS IN CLASSIFIED INFORMATION

At the end of the meeting Rep. Price questioned the way in which the story of the loss got to the press.

REP. PRICE: I would not question the source of the Senator's information. He is entitled to all information he can obtain, but I do question what I consider security violations in newspaper stories and magazine articles.

I insist that the Joint Committee go into the matter of leaks in classified information.

He referred in particular to the article in the *Nation's Business*, in June, 1949, written by Mr. Huie.

MR. LILIENTHAL: The most relevant question is whether the article contains data restricted by law, and this will take some study.

It was not submitted for clearance.

The usual practice among careful writers, where it may be a question of restricted data, is to make use of a voluntary service available from the Classification Division of the Commission.

The Commission does not require this, nor does the law provide that articles be submitted, but it is a general practice.

REP. PRICE: The conclusion in this article seem to be based exclusively on the fact that the Joint Committee has dismissed two aides described in the article as intelligence agents:

Senator Hickenlooper employed as Executive Director and Deputy Director of the Committee two intelligence agents, Fred Rhodes, Jr. and David S. Teeple. Both had been with General Groves in the Manhattan Project from the beginning; both knew the production and security problems.

MR. LILIENTHAL: These individuals were security officers, not production employees.

REP. PRICE: Did they know the extent of production?

MR. LILIENTHAL: No, at the Committee's request this information was never supplied to the Committee.

REP. PRICE: I feel that there is a security violation in this article. There is a concerted effort to discredit this Commission. The writer must have had some source of information, and this Committee must explore such leaks.

MR. LILIENTHAL: A statement is made in the article that your witness does not have the stomach to press forward the grim business of producing atomic weapons.

It is not only a reflection on my patriotism, as well as my stomach, but is completely contrary to the record of the Commission. This article contains statements in respect to two most highly classified pieces of information: the destructiveness of the atomic weapons tested at Eniwetok, and the number of weapons in our stockpile, and by a curious, distorted, and fantastic statement, the number of weapons that *should* be in the stockpile.

These will be examined more carefully and a report made to the Committee in executive session.

REP. HOLIFIELD: The article says: "Lilienthal and the Military have argued for two years over custody of the atomic bombs."

MR. LILIENTHAL: There have been discussions—the word "argument," I believe, goes too far. The President stated last July 24th that he had decided to leave the custody with the Atomic Energy Commission.

REP. HOLIFIELD: This writer says, "Why should not the Air Force take custody? How can an adequate Air Force personnel be trained to assemble and detonate the bomb if the Air Force has no bomb?"

If there is a renewal of the attempt on the part of some trigger-happy admirals and generals to take over the bomb, both as to production and custody, I think the American people ought to know it.

THE CHAIRMAN: The Secretary of Defense, Mr. Johnson, has assured me that he is quite satisfied with the present arrangement.

REP. HOLIFIELD: Can you assure us that notwithstanding the fact that the Commission is in technical custody of the bombs, they are available without undue delay to the Military in case there is need to deliver them?

MR. LILIENTHAL: I can.

## The Gas Pipe Line

## June 17 and 20

SEN. HICKENLOOPER: I want to refer today to the construction of 155 miles of pipeline to supply natural gas to Oak Ridge.

Question was raised as to the need for this pipeline, and you, Mr. Chairman, appointed a subcommittee, consisting of Mr. Durham, Mr. Price, Mr. Cole, and Mr. Van Zandt.

On May 23 of this year it reported that: (a) Adequate coal stockpiling appears to be feasible at Oak Ridge; (b) Reliance on fuel sources outside of the local area does not appear compatible with the original selection of the Oak Ridge site; (c) The Commission's action has been taken without consultation with the National Security Resources Board; and (d) Substantial improvement in the national fuel picture in the past eighteen months has not been reflected in the Commission's action.

The subcommittee recommended that: "The Joint Committee should make legislative provision requiring express authorization of Commission's programs having major economic security or production importance prior to Commission actions."[1]

The Joint Committee unanimously approved this report. The Commission, nevertheless, has gone ahead with this project.

MR. PIKE: The history of coal supplies at Oak Ridge has been troublesome. Here was an opportunity to get a completely independent supply of fuel at a saving of $1,250,000 a year. The cost is around $10,000,000.

If you can have two fuels, good management dictates, first, using the one that costs less and is not a good emergency reserve (gas), then, for the reserve, the one that is more costly and can be stockpiled (coal).

Some of the observations of the subcommittee are not particularly relevant. Some do not carry much, if any, weight. I respectfully submit that it is human to err, and I think, the Committee came to the wrong conclusion.

MR. WILLIAMS (Director of Production Division, AEC): There is no record that low-cost coal was a major consideration in the selection of the Oak Ridge site. In fact, in the early stages it was not known that large generating facilities would be necessary.

The gaseous diffusion plant, K-25, got under construction later than the electro-magnetic plant and the Clinton laboratory. A stockpile of coal was built up for the operation of the K-25 steam plant. A strike took place in March, 1946, and caused the stockpile to drop from 190,000 tons to 97,000 tons. It was built up to 235,000 tons by August, 1946.

From August, 1946, to August, 1947, there was a deficit of coal deliveries, again reducing the stockpile to 92,000 tons. This brought forcibly to our attention the critical situation which could occur if coal deliveries could not be built up.

To augment the stockpile of fuel, Oak Ridge procured 1,500,000 gallons of fuel oil, even though the price was equivalent to coal at $17 per ton.

On January 6, 1948, the Commission considered the proposal to use natural gas as the major fuel at Oak Ridge. Following this, the Oak Ridge office made a contract with the East Tennessee Natural Gas Company. The gas comes from the lower Texas Gulf Coast. The reserves there are supposed to be good for 20 years.

MR. PIKE: If we can save a million and a quarter dollars for 20 years and then are cut off, we would feel that we had done a good deal.

SEN. MILLIKIN: Economic dislocations affecting the coal economy are involved in a revolutionary change of that kind.

MR. PIKE: I hope they will sell the coal somewhere else.

SEN. HICKENLOOPER: Suggestion has been made in the past that because the Joint Committee did not specifically insist on other action being taken, the action taken by the AEC must be O.K. In this case, there is unanimous action of the full Joint Committee; yet it had no influence on this project and the expenditure of $10,000,000.

REP. HOLIFIELD: It is clear that the Joint Committee, in order to discharge its function properly, should be given the same power of authorization as is given other committees of the Congress.

THE CHAIRMAN: Regardless of the merits of this particular controversy, I take it that it is your thought that an amendment to the Act is in order to provide that projects exceeding a certain dollar value should be authorized by the Joint Committee.

The pipe line was discussed again on

[1] For developments arising from this proposal, see this issue pp. 218-19.

June 20th. Among the things that transpired was that the K-25 steam plant has a capacity of about 238,000 KW, has 14 generators and 3 boilers, which at full operation, consume 68,000 tons of coal a month. When all three boilers are in operation, some excess energy is produced which is sold to the TVA; but a much larger amount of energy (225,000 KW monthly) is purchased from the TVA to maintain full operation of the plant. The total production of TVA is over 2 million KW, but, for technical reasons, a large part of the energy needed by the K-25 plant cannot be taken from the TVA supply. Sixty million cubic feet of gas will suffice to maintain full generating power of the K-25 steam plant.

Another point which came up was that after the Federal Power Commission has certified the natural gas pipe line to Oak Ridge "in the interest of national security," a petition for re-hearing was directed to this commission by National Coal Association, United Mine Workers of America, and the Railway Labor Executive Association. Committee members were indignant that the AEC did not stop construction and suspend the contract pending this re-hearing.

## Community Management

A large part of the hearings between June 20 and 30 were devoted to community management at Richland, Hanford, Oak Ridge, and Los Alamos.

We can merely indicate the topics discussed, to give an idea of the caliber of material which was supposed to convict the AEC of "incredible mismanagement."

### HANFORD
### June 20, 21, 22

First, on June 20, was the spending of four million dollars by the General Electric on the construction of a Junior High School at Richland, estimated to cost two million. Senator Vandenberg complained that the AEC had not exercised sufficient supervision over the contractors, and had not been able to answer the questions by its own employees, thus necessitating the waste of valuable time by G. E. top executives.

MR. LILIENTHAL: The reason we insist on having the responsible contractor here is that we are trying to develop a sense of that same responsibility for the Government dollar which we ourselves should feel. If they do not feel that kind of responsibility, we will become a policing agency, rather than an agency seeking to encourage the company to do the best possible job. We are trying to build up something that is between private and public enterprise, and it helps a great deal to have the Director of Argonne National Laboratory, and the Chairman of the General Electric Company, right here, while these proceedings are going on.

SEN. HICKENLOOPER: While I believe that the contractor system has its merits, nevertheless, the very function of the Atomic Energy Commission is to be a policing agency over $700 million of public funds, and over $400 million of contract authority.

MR. LILIENTHAL: I hope there will be opportunity to discuss this, because there is a difference of view between us.

REP. COLE: I wonder if Mr. Lilienthal has that same feeling with respect to impressing upon the Commission itself the necessity of the Government's getting a dollar value out of every dollar that it spent?

On June 21, Mr. Winne made an interesting statement concerning the GE operation of Hanford:

MR. WINNE: We have built two new production facilities. The final costs were below estimates, and completion time was 60 per cent of that estimated. In those facilities, we have made improvements which will lengthen their life, increase their output, and save money.

When we took over, the major production facilities were deteriorating rather rapidly. This was due, not to any fault of those who designed and built them, but to conditions which could not be foreseen then and which threatened their continued operation.

By action of our technical and operating staffs, we have retarded this deterioration so that the life of these expensive facilities has been greatly increased.

We have also materially increased the output of these production units and reduced the amount of raw material they require. We estimate that this will save about $20,000,000 annually.

We have reduced by 20 per cent, and expect to increase this to 50 per cent, the liquid waste which must be stored; that will save a million dollars a year, at least. We have reduced materially the loss of plutonium going into these waste solutions.

We conservatively estimate that our operations of the plant have resulted in savings of $40,000,000 annually, taking into account depreciation.

REP. PRICE: Did you place in charge the same high type top personnel that you would in your own operations?

MR. WINNE: We have now in charge of our Hanford operations, Mr. George R. Prout, vice president of the company, who was formerly general manager of our air-conditioning departments.

Item 2 was changes in the plans for a *pumping station* at Hanford. It turned out that this change, although necessitating the sacrifice of a considerable initial investment, has resulted in a net saving.

The next topic was the *excess lumber*, bought by Hanford management when the construction was expected to involve replacement of the old production units (rather than their re-habilitation).

On June 22, MR. F. C. SCHLEMMER, Manager of one Hanford Operations office, made a statement: The Commission uses the General Electric Company as prime contractor in three types of activity: the operation of the plants originally built and those to be added, the management of the community, and the construction of the added facilities.

At Hanford, the Commission maintains a staff of approximately 340, to direct and supervise these programs.

The relationship between the AEC and GE requires a high degree of teamwork. This does not mean that differences of opinion have not developed. They have and they will continue to, in a program so large, so intricate, and so diversified.

The important objective, however, is to resolve all matters into what capable men consider to be the best answer.

On construction accounting, GE followed the practices employed during the war. As the program progressed, it became evident that these methods did not provide AEC with fully adequate means of control. During the current year, the controls have been strengthened in various ways.

The Committee then went into a lengthy discussion of administrative practices at the "company town" of Richland, adjacent to the Hanford

Works. SEN. HICKENLOOPER brought up a number of complaints, apparently collected by a newspaper editor who has been trying for two years to get office space in Richland. He accused GE of arbitrary practices in the selection of businessmen permitted to settle in Richland.

The defense of the administration was the limited space available in town, the necessity of protecting security and responsibility of providing adequate services to keep the employees and workers satisfied in a place as remote as Richland.

MR. VOLPE: An ordinary municipality does not have an obligation to industry in that area to provide for the people who work in their plants.

SEN. MILLIKIN: There has never been a town of 20,000 people, established overnight that did not almost overnight find the facilities necessary for its operation. Those things take care of themselves.

MR. VOLPE: Certain provisions are normal between landlord and tenant. The Government is the landlord here.

SEN. MILLIKIN: I challenge you to find a lease in private enterprise where there is any right to control a business.

MR. VOLPE: The business will have to be operated on a businesslike basis.

SEN. MILLIKIN: Why should not a man have the privilege of operating his business on an unbusinesslike basis?

MR. VOLPE: Because it would be detrimental to this community.

SEN. MILLIKIN: You have got a perfect pattern here for fascistic control.

MR. VOLPE: I agree with that, sir.

SEN. MILLIKIN: That is very interesting.

MR. VOLPE: As long as the Government is responsible for this community, there is responsibility for assuring that commercial facilities are operated on a businesslike basis.

SEN. MILLIKIN: It is perfectly absurd.

MR. VOLPE: The land is limited, and if a facility is brought into the town that does not give the service the community needs, the operations of the Commission will suffer.

SEN. MILLIKIN: Everything you have said is a casebook argument for controls which are the antithesis of free enterprise.

MR. VOLPE: We are not defending it. What we inherited was worse. All I am saying is that you cannot move away from that overnight.

THE CHAIRMAN: Do you attempt to set prices, their volume, their sales days?

SEN. MILLIKIN: The answer will be, of course, no. The offensive part is in the right to do it.

THE CHAIRMAN: I think that is a very practical question, though. Have you been doing any fascistic things out there?

MR. VOLPE: Absolutely not.

SENATOR HICKENLOOPER then brought up the resignation of Dr. Wende, Director of Pile Technology at Hanford. (See p. 222); and a letter by a guard addressed to Fulton Lewis Jr. alleging that Hanford guards are appalled by the security laxness which exists there. The letter says:

"How could a man walk through three guard posts carrying two slugs of uranium? At only one of these posts may a spot search be made of perhaps one out of five individuals.

MR. SCHLEMMER: It was one of many checks which have been made. Two uranium slugs were removed by an AEC security officer. They remained in control of the Security Office until they were returned.

The purpose was to find out whether these two slugs, which represent an infinitesimal proportion of the total material, would show up in the records.

MR. PROUT: It was months before the people responsible for accountability discovered that one slug was gone. They never did report the other one missing. This one was before processing; and we did not have a system that would show the loss of a piece of this material.

The portion that is difficult to account is that lost in machining operations; some goes as dust into the ventilating system and through the filters; some is dissolved and lost in solutions. Some goes into chips which are then washed, and the dust from them goes down the drain. The bulk, of course, is weighed and recast for further use.

It was felt up until that time that accountability for the raw material to within a small percentage was adequate. Who would want to remove a piece of raw material that would disclose nothing? A slug after processing would perhaps reveal some information; but the guys who do the processing can reveal a lot more by what they have in their heads than by taking a piece out.

SEN. HICKENLOOPER asked Mr. Winne about the profit the GE expect from operating Hanford.

THE CHAIRMAN: The General Electric naturally will secure a great advantage over anybody else in the industry if and when atomic power becomes useful for peacetime pursuits.

MR. WINNE: There is a provision in our contract, that in the operation of Knolls Laboratory we shall be willing to employ up to 15 per cent technical people from other industries who may have interests in this field. During the past year we had five men from the Westinghouse Company working full time at Knolls, and, I think, one or two other people.

THE CHAIRMAN: So the possible profit in the future would be in royalties from patents?

MR. VOLPE: Under the contract, all patent rights remain vested in the Government.

MR. WINNE: Here is a development which has the possibility of making electric power available over greater areas and at lower costs.

Any such development is of interest to the GE because we are an electrical manufacturing company; the more electric power is available, the more chance we have to sell our products.

## LOS ALAMOS

### June 23 and 24

MR. WILSON: Dr. Bradbury is the scientific leader and administrative head of the Los Alamos Laboratory. He has a major part in its program.

SEN. HICKENLOOPER: And in the production of weapons?

MR. WILSON: The laboratory is more in an advisory and pilot-line role in relation to the production of weapons.

SEN. HICKENLOOPER: What is Dr. Bradbury's salary?

MR. WILSON: $14,000 a year.

SEN. HICKENLOOPER: Then Dr. Bradbury, one of the top atomic scientists in the world, who occupies the top position in weapons production, gets a third of what Mr. Creedon gets at Hanford for building some houses, and production facilities that start out at $6,000,000 and end up at $35,000,000.

MR. WILSON: Dr. Bradbury's salary is comparable with the salaries of the directors of the other laboratories of the Commission, and with top salaries in leading academic institutions. It is less than would be customary in industrial positions.

SEN. HICKENLOOPER: I think the Commission is fortunate in having the services of Dr. Bradbury. However, he has nothing to do with operating policies. I believe that money is being spent at Los Alamos with an abandon that is really startling. $329,220 were spent to add 28 sleeping rooms to a log lodge. A Boy Scout Lodge was built at a cost of $50,000. The so-called Kellogg-Manley House was remodeled for about $48,000. About $300,000 had to be charged to faulty construction of houses. They were built under the Manhattan District, but the same architect has been continued on the job and has recently received in fees over $2 million.

MR. TYLER (Manager of Los Alamos) answered that the log lodge was the only place for transients in town, and was converted into a hotel; that the Boy Scout Lodge was used by all youth organizations; that the re-building of old ranch houses, permitting the Director and key employees to stay in the center of the town, was dictated by morale considerations, and that a group of Army Engineers who had examined the faulty constructions, had found the main source of trouble to be the permission to use green lumber in wartime.

MR. TYLER: I am assigned to the Santa Fe Office. That includes the laboratory and the town of Los Alamos. It also included eight other installations. It includes the whole production program for weapons.

Senator Hickenlooper may have left the impression that Dr. Bradbury is charged with the production of weapons. He is concerned in the design of weapons and the production of nuclear parts. The remainder of the weapons is constructed at other places and involves contracts with 1,400 different vendors in the United States.

My headquarters is Los Alamos. I interfere too much, perhaps, in town management, because on my arrival I found that a great deal of confusion in the laboratory stemmed from the town.

In order to get the program functioning again, it was necessary to rebuild the town. We hire scientists with the hope that they will devote their full energy to this program. One of the first questions which we are asked when we try to employ a scientist is: How is the housing, and how is the schooling? The question of salary comes later.

SEN. HICKENLOOPER: The Zia Company manages the town?

MR. TYLER: Zia is the operating contractor for the whole project. The University of California, unlike GE at Hanford, or Carbon and Carbide at Oak Ridge, does not run the laboratory. They staff it and do the technical work. The Commission is responsible for the structures and maintenance and steam and heat, and we do that through the Zia Corporation.

SEN. HICKENLOOPER: Everything the Zia Corporation spends is reimbursable by the Government? How do you justify a lump fee of $204,000 a year on top of this? Why does not the AEC put somebody in there and save the taxpayers $204,000 a year?

MR. TYLER: In the operation of a housing project by an insurance company, they hire a man and pay him. They do not try to do it themselves and save the difference. We are studying a Government type of operation, and if it develops that it is cheaper or simpler, I would be delighted.

## OAK RIDGE

### June 28 and 29

SEN. HICKENLOOPER read telegrams from Oak Ridge Veteran's Organizations protesting the new personnel policy of the AEC, effective January 9, 1949, which, they allege, grossly violates Section 12 of the Atomic Energy Act.

MR. VOLPE: The action taken by the Commission in no way affects the status of veterans under the Veterans Preference Act.

SEN. HICKENLOOPER: I am merely putting the protests in the record.

The Senator then dealt with the town management at Oak Ridge.

SEN. HICKENLOOPER: The Roane-Anderson Company is a management company employed by the Commission to operate the town of Oak Ridge. After reimbursement for all expenditures it gets $192,000 as fixed profit. It does not risk a single cent in this operation.

MR. COOK (Acting Manager of the AEC at Oak Ridge): The risk is the possibility of exceptions taken by the General Accounting Office.

SEN. HICKENLOOPER: I made a little investigation of my own home town of Cedar Rapids, Iowa, a well-run town of 76,000. That town has 617 employees in contrast to the 1,500 employees in a town of 8,400 at Los Alamos and 1,881 at Oak Ridge.

MR. COOK: Only 495 are in town activities. If we followed normal practice in construction contracts and realty management, Roane-Anderson would be entitled to a fee of $325,000; and they are receiving $192,000.

SEN. MILLIKIN: Why pay the fee at all? Why not run the business yourself?

MR. COOK: After giving it considerable thought we feel that it is more economical to the Government to operate with a contractor whose background is on a competitive basis.

SEN. HICKENLOOPER then criticized the *bus operations* in Oak Ridge by the American Transit Company, which, too, receives a fixed fee of $90,000 annually after full reimbursement.

MR. COOK explained the special conditions at Oak Ridge which make difficult economical operation of transportation facilities. In 28 cities of comparable population, the average population per mile of line is 1,943 persons. In Oak Ridge it is 135 persons.

SEN. HICKENLOOPER: I would like to talk about *garbage can bases*. The cost for 3600 was $346,000, close to $100 for each.

MR. COOK: Total cost was $118,000 or $34 apiece. That included the picket fence.

SEN: HICKENLOOPER: It would seem to me that is a fantastic situation on a garbage can base.

SEN. HICKENLOOPER read a letter complaining that residents at Oak Ridge are prohibited from making even the simplest repairs in their houses.

MR. WILLIAMS: Roane-Anderson never interfered with me unplugging my sink or putting in a fuse.

On June 29, MR. SHUGG gave figures in answer to complaints about veteran employment: In employment and layoff the AEC has complied fully with the Veterans Preference Act of 1944. 72.2 per cent of all AEC male employees were veterans, compared with 57 percent for the federal service as a whole. At Oak Ridge, as of June 27, 1949, veterans made up 51.3 per cent of the total employees and 74.3 per cent of the male employees.

MR. VOLPE: Some difficulties arise out of employment with contractors.

SEN. HICKENLOOPER: The money to pay contractor's employees comes from the Government.

MR. VOLPE: The Attorney General ruled that the Veterans Preference Act did not apply to employees of contractors.

SEN. HICKENLOOPER then spent a long time inquiring about specific construction and maintenance jobs contracted by Roane-Anderson.

SEN. HICKENLOOPER: I fail to understand why a consistent pattern of operation cannot be installed under a single head.

MR. COOK read a statement describing the aims and achievements of the Commission in Oak Ridge town management.

The goal has been ultimate withdrawal of the Commission from community operation through incorporation of the city of Oak Ridge, sale of land, and long-term leases to attract private capital. Steps toward accomplishment of this objective were:

All production and research activities were split organizationally and functionally from community operation early in 1947.

An industrial-type cost-accounting system was installed.

A master zoning plan was completed.

A program was initiated late in 1947 to perform long-deferred maintenance work and to construct new permanent housing.

An improved Commission-contractor relationship was installed transferring numerous functons to the contractor.

A firm of consultants was retained to study the feasibility of incorporation, and to draft a model charter.

Municipal costs are continuing to be reduced to permit operation, ultimately by an elected municipal government.

Hospital operation was transferred to a nonprofit corporation. Arrangements were completed for the sale of land to religious organizations. Rent and utility charges were adjusted toward comparability with the surrounding areas.

MR. COOK then referred to the Oak Ridge Plant operations: Since January, 1947, the unit cost of producing U-235 has been reduced 50 per cent—a saving of $22 million per year.

SEN. HICKENLOOPER: I dislike having a self-serving declaration of great reduction made in public, without the ability of testing the data. I would suggest that in executive session we may go into the basis upon which these alleged cost comparisons are made.

MR. WILLIAMS: There is one comparison that does not need executive session, and that is that in January, 1947, in the production of U-235, we had approximately 11,000 people employed, and at the present time we have 4,700.

SEN. HICKENLOOPER: I disagree. If we are speculating I will speculate on the other side and say it was most inefficient up to the present time.

MR. COOK: Two years of intensive design resulted in plans to construct an addition to the gaseous diffusion plant which will materially increase production of U-235, and decrease the unit cost.

The rate of production of radioisotopes has increased six times in the last two years. One hundred fifty-six stable isotopes of 38 elements have been separated by the electromagnetic process. Marked progress is being made in scientific research at the Oak Ridge National Laboratory. The first plan was estimated to cost $48 million. Further considerations resulted in a plan making maximum utilization of existing facilities, at an estimated cost of $18 million.

Last fall a plan was evolved for the opening of the town and establishing a controlled plant area. It provides control over the number and identity of personnel in this area at any time, and permits isolating quickly the entire controlled area. By this step it was possible to reduce the patrol force from 306 to 166 and maintain adequate security.

SEN. HICKENLOOPER: On this matter of town management, we have now gone through a number of instances in Hanford, Los Alamos, and Oak Ridge. I think that some very startling things have developed about Los Alamos and Oak Ridge. I have never been able to tell what it costs to operate the town of Hanford.

## Reactor and Laboratory Costs
## Senator Hickenlooper Rests His Case
## June 29 and 30

AFTER having spent many days on minutiae of town operation, such as garbage can bases, Senator Hickenlooper hastily skipped over such fundamental items as the selection of reactors to be built, the estimates and actual cost of their construction, and the cost of building the major laboratories of the Commission. A well-prepared investigation should have devoted much more time to a discussion of the nonsecret aspect of these major activities.

SEN. HICKENLOOPER: I read from the Commission's report on construction programs, presented to House Appropriation Committee on May 16, 1949, to show wide variations in estimates and actual costs of construction.

Various figures representing the total estimated cost of the Argonne Laboratory facilities ranged from $25,000,000 to $100,000,000, but with no real engineering basis for cost estimates. Eliminating the reactor because of a possible transfer of location, the estimate for the DuPage County facilities now is $61,100,000.

In the New York operations, the Commission's statement says:

The estimated cost of the pile complex was a working estimate as of July, 1947, based on meager information. The pile itself was originally contemplated to be a duplicate of the one at Oak Ridge, but this was changed and an entirely different pile was agreed upon. From that time on, the project was new, with no past experience to use as a guide. Each step required proving before being incorporated in the design. During the construction, estimates were increased because of rising costs of labor and materials.

I have a letter, from the chief of construction for the Ferguson Company at Brookhaven. It reads:

In 1947, contract was placed with the H. K. Ferguson Company for construction of the 'first peacetime' atomic pile at Brookhaven to be completed in a year at an estimated cost of $16 million. Two years after ground breaking in August, 1947, the pile is not operating and the final predicted cost will be $23 million. The assumption that design and construction could economically proceed together was a fallacy, and delay in construction through lack of plans was responsible for much of the added cost.

The Senator then read a letter from a Mr. Louis H. Goeltz of Milwaukee, an engineer who has had "some connection" with the Argonne construction, entitled: "Whoops — There Goes Our Money Again." Mr. Goeltz said:

"Why it was necessary to build this costly temporary project and not have this cost applied direct to the permanent project is beyond my conception."

About the proposed pile installation at Schenectady, the AEC Report says:

The estimate of $26,965,000 was originally intended to cover the laboratory and reactor. The final indicated cost for the laboratory closely approaches the original estimate for both laboratory and reactor. An estimate of cost for the reactor of $20,912,000 was based on meager information.

THE CHAIRMAN: Are there any other matters?

SEN. HICKENLOOPER: I would like to examine the traveling itinerary of Mr. Lilienthal, together with any persons who have accompanied him on these trips, where they were trips at Government expense. I am not interested in his vacation time, but where the Gov-

ernment paid the transportation and perhaps a per diem.

MR. LILIENTHAL: I will put in about my vacations, too, if it is desired.

On June 30, SEN. HICKENLOOPER added figures on the costs of Brookhaven. He concluded: I have a large file of complaints about alleged shortcomings in various places that I expect to turn over to the Committee staff for analysis. I feel that I cannot proceed further with my end of this matter, until the Joint Committee has taken its action in connection with the security files which I wanted to use as one portion of this investigation.

There are some other phases: For instance, matters in connection with international operation of atomic energy: my feeling is that that should be first canvassed in executive session.

There are certain more or less technical fields in this program that also should first be canvassed in executive session.

I shall desist from any further pursuit of this until the Committee has made some decision on those important matters.

THE CHAIRMAN: I will instruct the staff to begin analyzing the matters that you are going to turn over.

MR. LILIENTHAL: You will recall that it was we who asked for an investigation. Our accounting will not be long. It will not be a defense. On the contrary.

One matter troubles me; that is continued references to a large number of complaints.

We would be much happier, although obviously our work is suffering, to have these complaints out and discuss them in public hearings. I know something about how easy it is to write a complaint when one does not have to support it.

THE CHAIRMAN: I can understand your desire to have this entire thing in the open. Just as quickly as we can, we will let you know what it is, if it seems to have any weight at all.

# Witnesses for the Commission

## MR. LILIENTHAL'S DEFENSE

MR. LILIENTHAL: On the 25th of May, I transmitted to the Chairman of this Committee a letter saying:

A full, complete and speedy report on the charges that the United States atomic energy program is virtually a failure is a matter urgently necessary: The chief question is: Is this country weak in atomic weapons and materials, as implied by the broad charges leveled against the Commission?

Our witnesses will testify as to what have been the results of the last two and a half years.

The question has been raised as to whether these over-all results are relevant to the charges of "incredible mismanagement."

One of the great statements of ancient wisdom is: "A good tree cannot bring forth evil fruit, neither can a corrupt tree bring forth good fruit. Wherefore, by their fruits ye shall know them."

On the 14th of June, 1946, Bernard Baruch, in one of the great state papers of all time, summarized where mankind stood: "The light at the end of the tunnel is dim, but our path seems to grow brighter as we actually begin our journey."

In April of 1947, when the Commission began its work, that dim light at the end of the tunnel was so dim as to be no light at all.

Russia, and Russia only, among the great nations of the earth, has been unwilling to take those steps which might make that dim light brighter.

Confronted with this situation, the United States Atomic Energy Commission believed that we should let nothing stand in the way of arming this country atomically, to erect a great deterrent to aggression in the world; that we should establish unquestioned and unmistakable leadership, and in this way buy time for reason to prevail. The country had to be told that monopoly in the making of atomic weapons could not last indefinitely, that Russia will in time be able to make an atomic weapon. But the country had not been told that numbers are crucial in providing a deterrent to aggression: that high level of production and quality could provide what a dwindling monopoly lost us.

We believed that urgency was required, that boldness was necessary. We did not believe that the bureaucratic rule, "Don't stick your neck out," had any application to the situation.

Whether what has been presented substantiates the charges made is for the country and the Committee to decide. We believe that none of the matters presented measure up to the charges.

We make no claim to perfection. Over 60,000 people are engaged in this work. It would be very extraordinary if at this moment one of them were not doing something careless, something stupid, something contrary to his instructions, or just contrary to good sense.

## DR. BACHER
### July 6

DR. ROBERT FOX BACHER (Chairman, Division of Physics, Mathematics and Astronomy, California Institute of Technology): When the Atomic Energy Commission took responsibility, I went to Los Alamos to make an inventory of the vital components of weapons and fissionable material.

I was deeply shocked to find how few atomic weapons we had at that time. This came as a surprise to me in spite of the fact that I had been intimately associated with the work of Los Alamos roughly a year before.

I went into the vaults and selected at random cartons and containers to be opened. I used counters and other methods to determine whether the materials were what they were declared to be.

Judging by the consternation on some faces, I concluded that this must have been about the first detailed physical inventory that had been made.

Our first effort had to be devoted toward changing the weapon position.

Many people who had worked on the project had a definite commitment to go back to their normal pursuits. Many industrial contractors had been promised that they would be relieved at the end of the war.

Los Alamos suffered a series of calamities.

In December, 1945, the project ran out of water. All the water for a period of months was obtained by hauling in tank trucks. The pipes froze up, water reservoirs ran low; the project very nearly came to a dead standstill.

During the fall of 1946, after the passage of the McMahon Act, spirits began to pick up at Los Alamos.

## Problems at Hanford and Oak Ridge

At Hanford, at the end of 1946, the pile deterioration had become a very serious matter, and our attention had to be focused on difficulties which, at that time, seemed to be technically insurmountable.

The Hanford plant had been built by the Du Pont Company. At the end of the war, Du Pont asked to be relieved. This gave rise to great uncertainties in the technical personnel, but many of them stayed on through these rocky times.

At Oak Ridge, the production at the end of 1946 at the diffusion plant was good.

The electromagnetic plant was still operating, and its costs had been cut, but it was clear that more changes were in store there.

At the end of the war, there was a great deal of optimism about how nuclear reactors could be built overnight, and a big power industry was going to come out of this in a great hurry.

The years 1946 and 1947—particularly the former—brought us a great deal of technical information which was in the nature of a surprise. We probably should have anticipated some of it, but the fact is that the deterioration of materials in a reactor, and the problems this would cause in building high-power reactors were greatly underestimated.

These problems had to be overcome, and this set the whole reactor development back a great deal. This was a disheartening fact at the end of 1946.

What we did during 1947 and 1948 was largely conditioned by that state of affairs.

Our first attention had to be directed toward the production and improvement of atomic weapons and of fissionable material to go into them, and this is what we did.

We felt it our first responsibility to build up the Los Alamos Laboratory. During 1947, it went through a change that I could scarcely believe, and today it stands as a very strong laboratory with a remarkably high morale.

At Hanford, the pile deterioration was attacked vigorously, and also the problems of replacement reactions in case the deteriorative problems could not be solved.

The latter have been rather successfully solved in the past two years, and in the meantime, replacement piles have been under construction, and have been carried through to completion.

During that same period, we went rather carefully into the subject of how we might get more fissionable material out of a given amount of raw material, which, as you know, is at a premium.

There has been a considerable success in these efforts, and I am confident that it will be even more marked in the future.

At Oak Ridge, during 1947, the operations of the electromagnetic process were considerably reduced because of the higher costs and the improvement achieved in the diffusion process.

During 1947, we did not have much success in stabilizing the laboratory at Oak Ridge. A difficult situation arose because of changes in personnel and because the contractor wished to be relieved of his responsibility. The laboratory has only recently recovered from some of the shocks that had occurred during that period.

Remarkably enough, during 1947, and still during 1948, the laboratory has continued to be a major source of fundamental information about atomic fission and various nuclear processes, and has produced a remarkable series of publications.

## Advances in Research

In research and development we were guided to a very great extent by the General Advisory Committee appointed by the President at the beginning of 1947 and composed of distinguished scientists and technical people.

During that same period, we set up an *ad hoc* advisory committee on biology and medicine.

During the war, only the subjects in biology and medicine of the utmost urgency in manufacturing were studied at all.

We tried to expand the work in biology and medicine to reach better understanding of the effects of radiation, and to permit some of the beneficial effects of atomic energy to be enjoyed at the earliest possible moment.

Subsequently, a permanent advisory committee on biology and medicine was set up, composed of distinguished doctors and biologists.

During 1947, the advances in the research laboratories were very considerable.

At Berkeley, the research laboratory had quickly gone into high gear under the enthusiastic leadership of Ernest Lawrence; new machines were being developed, and rather startling new results have been achieved with these machines.

The Brookhaven Laboratory on Long Island came into being during this period and today can be numbered among the strong research laboratories of the country.

The Argonne Laboratory in Chicago had been housed in buildings loaned by the University. Its buildings in the country where the reactors were housed were on borrowed land, where commitments had been made for evacuation at the end of the war.

In spite of scattered facilities, good reactor work and fundamental research were going on. The University of Chicago cooperated very thoroughly, and there is today the closest exchange of ideas, of personnel.

At the Knolls Laboratory at Schenectady most of the work had to be carried on in temporary buildings, but the reactor design work got ahead.

One of the big problems in 1947 was that of raw material. We had to figure out how to get more out of the available amount and how to get more raw material.

## The Eniwetok Tests

Probably the most outstanding accomplishments during 1948 were the Eniwetok tests in the spring. We learned more from these tests about how the atomic bombs work and what we might do in further design work than had ever been learned before.

The purpose of the Eniwetok tests were to find out how better bombs might be built, and to that end a great many measurements were made. They were, for the most part, very successful. The success of the development which led to the design of the Eniwetok bombs gave us great heart for future development.

SEN. HICKENLOOPER: Were not the weapons tested at Eniwetok conceived during Manhattan District days and laid aside for testing later?

DR. BACHER: If by "conceived" you mean that there was a gleam in the

eye, then I would agree with you.

SEN. HICKENLOOPER: I meant that some of the mechanical ideas were proposed under the Manhattan District.

DR. BACHER: One of the principles incorporated in the Eniwetok tests had been planned during the war. But one of the major developments—I would say the major development—we would not have dared to do at that time. I would say that what was tested at Eniwetok was designed on the basis of work carried out at Los Alamos during 1947.

The Eniwetok tests lead to the design of weapons making considerably better use of fissionable material than any we knew about before. One point was completely new, and even contrary to some of the ideas we had during the war.

On the production front during 1947, and more particularly during 1948, there were major accomplishments at Hanford, which gave us information on the origin of pile deterioration and on how it might be circumvented.

Other developments at Hanford led to further increase in the amount of fissionable material produced from a given amount of raw material.

There were considerable improvements in the efficiency of the present chemical process and in the development of new processes which we hope can be installed in the future.

Probably the largest peacetime construction project was undertaken at Hanford—a replacement pile which is now completed.

A plutonium fabrication plant was started and largely brought to completion on one of the most rush schedules that the Commission undertook to carry out.[5]

At Oak Ridge in 1948, the diffusion plant further increased its production and decreased its staff.

The Y-12 plant was thrown completely into stand-by condition.

What subsequent technical developments will show, no one can guess, but so far the diffusion process has outstripped the electromagnetic process.

## The Reactor Program

The main reactor responsibility at the beginning of 1948 was transferred to the Argonne Laboratory.

I mentioned before that we had been greatly disappointed by some of the obstacles found in the development of new reactors. During 1948, many of these came a little closer to solution.

The Argonne Laboratory went ahead with the designs of a fast reactor. They also carried the main responsibility in the development of the materials-testing or "highflux" reactor. It was initially designed at Oak Ridge Laboratory, and they now cooperate in its construction.

The Argonne Laboratory, with the cooperation of the Westinghouse Electric Company, is also carrying the main responsibility in the development of a Navy reactor for the propulsion of a ship or submarine.

The reactor under development at the Knolls Laboratory, had been largely carried on by the General Electric Company, though here, too, a great deal of information was obtained from previous work at Argonne. The reactor at the Knolls Laboratory is a so-called "intermediate reactor" designed with two aims in mind: The production of usable power and the accomplishment of the breeding principle.

The reactor program has not gone ahead as fast as we had hoped it would. One reason is that it had to take second place to the weapon production and to the problems of the production of fissionable material.

But I believe today we stand on the threshold of a great development in this field. I am sure that if we—and by "we" I mean the people of the United States—are not timid in going ahead with this work, major successes will come to us. Timidity and playing safe simply is not a proper background for atomic energy development.

THE CHAIRMAN: If it works, what will it mean to the people of the United States?

DR. BACHER: I think nuclear reactors will have a great effect upon the lives of the people in this country.

There are great areas today which are essentially uninhabited because of the absence of power and water. Atomic energy will not solve all their problems, but at least it does not depend on the proximity to coal or oil.

In the fall of 1948, we found that some of the bold steps that needed to be taken required the setting up of a site, remote not only from major cities and other installations, but also from any of the manufacturing installations vital to the project itself.

Accordingly, steps have been taken to set up such a project in Southern Idaho near Arco.

During the past year there has been a considerable success in design and critical tests of the reactor at the Knolls Laboratory. They made us understand some problems in the operation of intermediate reactors which had not been fully understood before. This will undoubtedly change in some ways the plans for that reactor.

SEN. HICKENLOOPER: There must be a point where design is frozen and construction begins.

DR. BACHER: It is my own conviction that in the development of reactors a certain boldness is needed. We must go ahead with design and construction long before all of the problems are understood.

At Los Alamos a fast reactor, which was designed at the end of the war, has been constructed and put into operation in 1948, and more recently, operated at the power for which it was designed.

This is a relatively small reactor compared to those needed as preliminary units for high-powered reactors; but it is the first operating fast neutron reactor and the first reactor designed to operate with plutonium as a fuel.

At the Brookhaven Laboratory, there has been under construction during 1948 a reactor for research use generally modeled on that at Oak Ridge, but incorporating several improvements and intended to operate at somewhat higher power. It will be a major research tool in nuclear physics and general pile technology.

## Basic Research Program

One of the principal research aims of the Atomic Energy Commission is to promote better understanding of the atomic nucleus. It would be impossible for me to say that this will lead to the production of better or more fissionable material, or better or more weapons, but I can assure you, without any qualification at all, that if we are to have a sound atomic energy project, we must have a sound, vigorous, and all-inclusive general research program behind it. Most universities at the end of the war found that it was impossible to go into those subjects with the funds at their disposal.

The Office of Naval Research performed a great service to the country, in helping the universities to get started with this work at the end of the war. The Commission is now cooperating with the Office of Naval Research, and in 1948 it furnished somewhat more than half of the funds for nuclear physics projects.

The Commission has also undertaken a considerable number of new projects by direct contract.

[5] See pp. 229-30.

They form the foundation stone on which future work will be built, the means by which new people will be trained.

## General Progress

To sum up, I think it is safe to say that today the bomb production is in the best shape ever. Bomb development is now in process, based primarily upon the results of the Eniwetok tests, which will lead to a major improvement in the utilization of fissionable material.

On the production of fissionable material, the efficiency in the production of U-235 is still increasing. The electromagnetic plant is no longer in active stand-by condition.

The plutonium production is increasing and is greater than it has ever been, and we can expect more in the near future.

New facilities for production are now ready. There has been a major accomplishment in prolonging pile life.

We are now producng more plutonium from a given amount of raw material than ever before, and facilities are now available at Hanford for metal fabrication.

On raw material, the limited facilities for the production of raw material in this country are now expandng. There have been major successes in technical work which should lead to the utilization of low-grade ores.

On reactors the problems on materials, both the structural materials and the fuel elements, are beginning to be licked. We have learned a great deal about the use of liquid metals in the cooling of reactors.

This is a major step toward the production of power, and I think one can say, without being overoptimistic, that we are getting to the point where we might consider this production really feasible.

There has been a major advance in the fabrication of unusual metals. Fabrication of many of the metals needed in reactors has involved metallurgical problems which four or five years ago were thought to be impossible and two or three years ago, extremely difficult.

The results of the postwar encouragement of research are now beginning to show in a major increase in the output of scientific laboratories. The scientific journals are full of important articles based on work carried out with the help of funds provided by the Commission and materials produced in Commission's reactors.

I do not mean to imply in the optimistic statements I have made about research that you can expect the ultimate tomorrow. Research must be carried out over a long period of time; many experiments will be done which will not lead to results of any help in the project, but occasionally there will be that unusual experiment that will turn the tide in some new development. This is the history of all scientific and technical developments in the past, and I am sure one can go on this in the future.

In conclusion, I would like to emphasize one or two points. I do not believe that you can examine one small fraction of the atomic energy project and hope to come up with definitive conclusions or answers. You must look at the project as a whole.

The project is technically very closely tied together and the participation by the Commission in Washington is not just a participation on paper. The decisions and plans must show an integration of all the work on the project.

Furthermore, I believe that the people who work on the project must have some confidence in its stability. It was the uncertainty of the project at the end of the war which sent many away from the project. We must at all costs avoid that loss of confidence.

Our real strength for the future depends upon progress. Many people say, "Let's lock up the secret of the atomic bomb." Nothing could put the United States in a poorer position in the future. We depend not upon locking things up, but upon new developments and new progress.

The Commission must be charged with the job of getting ahead as fast as possible with the development of atomic energy, and anything that detracts from that speed will endanger this country.

SEN. HICKENLOOPER: I do not have very many questions, if any. I have tried to make utterly clear that I feel the scientific people who are engaged in this program have done a tremendously fine and integrated job. I believe their integrity has been high. Within the limitations they have to work with, I think they have done a reliable job for the country.

Are you satisfied with the progress in waste recovery?

DR. BACHER: The atomic energy project is not one to be satisfied with anything. I think in any phase of the project, we could always do better.

SEN. HICKENLOOPER: Are you satisfied with the progress of the chemical separation processes?

DR. BACHER: I would give the same answer to that.

SEN. HICKENLOOPER: I shan't try to press that further.

DR. BACHER: I think that it is not possible to draw a sharp line between the planning of technical developments of the project, and other questions of management. These are the most vital questions of management, and other decisions are made so that these may go ahead with the utmost speed.

THE CHAIRMAN: You say that we can tell by the results—namely, the production of fissionable materials and the number of weapons. I take it that in your opinion, you would be satisfied to have those results made known to the American people as a test of the success of the Commission's activities.

DR. BACHER: In order to make that single piece of information carry the amount of knowledge that it should, people would need to know considerably more about what the effects of a given bomb would be, how the bomb was constructed, what went into it, and indeed, a whole lot of things about the fundamentals of atomic energy.

It has been advocated, that material be devoted to the development of reactors and not to the production of weapons. I do not believe that anyone can offer a sensible comment on that unless he knows how much material goes into a bomb, how much material there is, and how much material might be used in a reactor.

I am afraid that on these subjects we have, by reason of security imposed on the project, a great deal of misunderstanding and, therefore, of misinformation, and this gives rise to the jitters and hysteria which we find at this time.

## Security

REP. JACKSON: If the scientific know-how is in good hands, the only other danger would be the dissemination of the knowledge we now have if it is not properly managed.

Do you feel that proper steps have been taken, to provide adequate protection to this country in development of new weapons?

SEN. HICKENLOOPER: I think it is unfair to Dr. Bacher to ask him to give an opinion on security when I will not be able to confront him with various instances and situations.

As long as this security matter has been taken away from me until the Committee decides what it wants to do

with it, it is a field which in fairness cannot be discussed on one side alone.

DR. BACHER: Reading the hearings on the confirmation of Dr. Smyth, I find Senator Hickenlooper agreed that on the over-all question of security a pretty good job had been done. This is not my opinion, I am only quoting his.

### British and Canadian Atomic Energy Development

REP. JACKSON: I wonder if you would comment on our policy in connection with the British and the Canadians.

DR. BACHER: The cooperation with the British and Canadians during the war did not cover all parts of the project, but many parts of the project it covered with considerable thoroughness.

With reference to the heart of the project, the laboratory at Los Alamos, the first discussions with the British were undertaken in August of 1943. Subsequently, a sizable British mission came to Los Alamos, headed by Sir James Chadwick.

These men worked in many parts of the project. Several of them were in the Theoretical Division and contributed very important ideas to the development of the bomb. They had access to the work in experimental physics, in experimental chemistry, to the metallurgical work, to the ordnance development, and to bomb physics work. In fact, they had general access to all of the information developed at Los Alamos.

One of them was a very close associate of mine in the Bomb Physics Division and participated in many of the critical assemblies of vital materials which were made in the development of the bomb. So they had a thorough and complete knowledge of all the bomb work.

On other parts of the project I know they were associated intimately with the development of the electromagnetic process of separation, with the diffusion process in its early days; and the Canadians in particular were closely associated with the development of the pile at the Metallurgical Laboratory at Chicago.

Their participation in 1946 was cut to zero, with the passage of the Atomic Energy Act. There have been established certain areas of technical cooperation spelled out in detail in papers that have been furnished to the Committee. There are, I believe, nine such areas, some classified, some unclassified.

REP. JACKSON: Do you feel that it is going to be easy for any other powers to catch up with the United States, considering the productive facilities that we have available and the efforts that are now being made?

DR. BACHER: How fast other countries will move depends upon how vigorously they pursue their atomic projects.

The British have an atomic energy project. They are setting about the production of fissionable material and have announced that they are developing and intend to produce atomic weapons. I am sure they will be successful in this undertaking. They have all of the technical know-how, all of the scientific background that is necessary for such a development, and I believe it is only a question of time until they do produce bombs.

Now, it is a long step from the production of the first fissionable material to the production of the first atomic weapon. It is another long step from the production of the first atomic weapon to the production of atomic weapons in quantity. It is also another long step from the development of the first reactor to the development of reactors which produce fissionable material in quantity. It is a still further step to the production of reactors which will produce useful power and possibly even breed fissionable material.

## GENERAL McCORMACK
## July 7

MR. LILIENTHAL: Under the Act, the President once a year fixes the weapon requirements upon a joint report of the Commission and of the National Military Establishment.

How these requirements are to be met is determined by the Commission after consultation with the Military Establishment.

The Director of the Division of Military Application is the General Manager's Chief Deputy in the area.

Brigadier General James R. McCormack has been the Director of Military Application since the Commission took over the atomic energy project.

GEN. MCCORMACK: The work of a laboratory goes forward in the long term only when supported and guided by management which permits and encourages forward motion. You do not get a solid production program, within a framework of mismanagement.

At the beginning of 1947, Los Alamos was on its back. To the Commission, three primary managerial improvements seemed necessary.

A long-range program of research and development in weapons. It was developed and put into effect. Relieving Los Alamos of routine weapon production. This is easy to say. It was hard to do. It was necessary to make Los Alamos a place which would attract and hold scientists.

All of this had to be done without interrupting production of as many weapons as could be made with the facilities we then had.

The handful of people who had in their minds the "know-how" of weapons production had to advise in laying out the long-term program, and to prepare for the Eniwetok tests.

The production task was much larger than the "custom" manufacture used until that time. The Commission decided to bring industry into this work. In this we faced many problems of security and of mutual education of scientists and industrialists. While we were getting production started we had to arrange for a complete weapon model change.

After two years, the weapons production is on a stable basis. The plants dispersed widely through the country, have cost over $100 million. All serious bottlenecks have been broken.

Aspects of weapons production not intimately connected with nuclear developments are now located elsewhere. We are building an ordnance engineering laboratory at Albuquerque, New Mexico. Meanwhile, the Los Alamos Laboratory has gone back up to a strength of some 1,700 persons, devoted primarily to research.

## DR. KELLY
## July 7

DR. KELLY (Vice-Chairman of Bell Telephone Laboratories): The Commission had requested me to make a study of Los Alamos and Sandia and advise them as to the best method of operating Sandia since the University of California wished to withdraw from it.

My general conclusion was that it was a very good organization, doing a fine job. As already recognized by the Commission, the greatest need for improvement was in areas farthest removed from basic research.

The professional staff was strong. A good job of recruitment had been done. The internal morale was high. The housing was poor, but there were good plans for improving and building permanent laboratory structures. A properly balanced fundamental research

program was going on as well as an active program improving methods of the weapon evaluation. While the final payoff is the dropping of a missile such as at Eniwetok, the more you can, through instrumentation and theoretical considerations, get figures that allow you to move along, the better.

In the early days of the Commission the contacts with the armed forces were not so good. The Special Weapons Project Organization has set up an organization at Sandia to improve it. A foundation is now set for a better developer-user relationship.

## DR. BRADBURY
## July 7

DR. NORRIS BRADBURY (Director of Los Alamos Laboratory): You have heard about the difficulties of the Los Alamos Laboratory following the end of the war. Great credit should go to General Groves for the decisions he made, practically as an individual, during that time. However, he could not make permanent commitments.

The passage of the Atomic Energy Act of 1946 appeared to us a proper and a right thing. The Commission appeared to be the right people for the right job.

Here are some of the administrative things the Commission has provided for the laboratory. The Commission asked the laboratory in January, 1947, what the laboratory thought it should be doing. We presented a basic long-term and a specific short-term program.

It came back largely approved, but coordinated with other agencies and with the suggestions of the military people. This approach is very attractive to the personnel. They feel as if they had a definite part in establishing a program. By far the larger part of our technical staff have academic backgrounds. It was our opinion that an academic contractor provided the best possible administrative framework. The Commission sustained us.

General Groves had initiated a permanent housing program. This was amplified by the Atomic Energy Commission.

I cannot emphasize too strongly the importance of providing technical personnel with adequate homes, community facilities, schools, and medical care.

No scientist *has* to work on atomic bombs, nor does he have to live in a community where he cannot own his own home. It is important that we make these people proud to live at Los Alamos and that their families can be happy.

The patriotic motive is strong. The necessity of doing this type of work appeals to more and more people. However, a patriotic motive cannot be counted on to induce people to live under conditions resembling a construction camp.

SEN. MILLIKIN: I think there is an unfortunate impression developing that the scientist must be babied. He is a normal American citizen who takes his knocks, as well as the good things.

REP. PRICE: Would you describe it as temperament, the fear of a scientist that he may be so restricted that he would never accomplish the things that he would like to accomplish?

REP. HOLIFIELD: In the normal pursuit of his avocation, does not a scientist like to go to scientific gatherings and present papers on his work? Is that not an important part of his life, that he be free to talk about the work that he has been doing, and to receive such recognition as he may have earned?

SEN. MILLIKIN: The lawyer builds up his prestige by winning cases; and the doctor, by not causing too many people to die; and the Senator by making headline speeches; and I am quite concerned with restrictions that rest on a scientist in this business of writing papers.

That sort of activity seems to be very important from the prestige standpoint.

DR. BRADBURY: The thing strikes most deeply at the young man just out of graduate school whose scientific career is going to be judged by the papers which he publishes.

We find two ways of handling this. In the first place, a certain amount of our research can be published. Over the past two years several hundred papers have been declassified.

For those who cannot publish, our information meetings, in which restricted data—not in the weapon field—are discussed by cleared scientists from different laboratories, provide means of self-expression for the scientist; he thus gets recognition, which is good for his ego.

## MR. PARKER
## July 8

MR. JAMES W. PARKER (President and General Manager of the Detroit Edison Company of Detroit, Chairman of the Industrial Advisory Committee): The Industrial Advisory Committee is a group of industrialists who were drawn from quite a wide area of industry and given every facility to see the Commission's operations.

Visiting and discussion led to the first of our conclusions: That in general we believed that the Commission was making great progress; that they were to be commended on the methods employed, and we applauded their policy of placing great reliance upon industrial contractors.

We recommended the formation of a permanent industrial advisory group. We thought that the Commission would benefit by the continuing advice of a rather large group of industrial men, predominately in executive positions, but with training in engineering and scientific work.

There were certain matters of management that we recognized as outside our terms of reference, but we asked the Commission if they would like to have our comment with the idea that some changes might conduce to a better participation on the part of industry.

The General Manager, in our opinion, had too many division and department heads reporting to him. As we discussed these matters with the Commission, they began to make changes faster than we could recommend them. Before the report was turned in, the Commission had made considerable changes in their organization; among others, they had appointed a Deputy General Manager.

SEN. HICKENLOOPER: I do not believe I have any questions of Mr. Parker.

## MR. HARTER
## July 8

MR. HARTER (Member of the Industrial Advisory Committee): Great industrial developments have, as a rule, begun small and, if well-managed, have prospered and become large. In that time they have had an opportunity by trial and error to find what works well and what does not. The Commission is engaged in probably the most difficult industrial operation that there has ever been. In thinking of their progress, we should contrast a period of about two-and-a-half years, with the twenty-five or fifty years that corporations like my own [Babcock and Wilcox] have had to grow up to about a fifth of their size.

Judged against that background, I feel that their accomplishment is remarkable.

The methods of estimating operations have come in for a good part of your discussion. I think that you must recognize that too much control can do harm

as well as good. I do not think any corporation ever finds itself within its estimates. Most corporations do not feel that it would be a healthy situation if they were. They would feel that the men responsible for the estimates are making them so large that no trouble will happen.

In looking at the work of the Commission, I am greatly impressed with the high sense of duty, and with the effort which they are applying to their work.

I do not think that any corporation that I know of has any better approach to their problems, or works any harder at it.

SEN. HICKENLOOPER: Has your company engaged in any work for the Commission?

MR. HARTER: Compared with our total operations, I suppose, it is a matter of a half per cent, or something of that sort.

## DR. DUBRIDGE
### July 8

DR. DUBRIDGE (President of the California Institute of Technology, Member of the General Advisory Committee): I would like to say a word about the position of basic research in this country. In my view, it is very precarious. We are bragging a great deal about our scientific personnel and resources, but we are doing very little to strengthen them.

During the war the scientists were mobilized into great war laboratories and were spectacularly successful in developing new weapons. As a result, there is a widespread feeling that the only purpose of science is to develop weapons and that, therefore, science can be kept on a wartime footing.

Both of these assumptions are grossly untrue. The chief goal of science is not to develop weapons, but to understand nature. Knowledge is, and always has been, primarily used to improve the happiness and welfare of men; nor can science thrive on wartime footing.

Science did not thrive during the war. On the contrary, science was stopped during the war while scientists devoted themselves to developing weapons.

When the practices and techniques of weapon development are extended to pure science, science is stifled rather than strengthened, and yet it is a tragic fact, which bodes ill for the strength of science in this country, that the only federal agencies today which are supporting to any large extent basic science are the agencies whose primary function is military—the National Military Establishment and the Atomic Energy Commission.

Both have done a fine job in the supporting of science, but since their interests are largely in weapons, the areas of science they support are those related to military applications and the methods that they are forced to use derive more largely from the traditions of military development than from the traditions of pure science.

The support of pure science, with which also goes the education of new scientists, is a totally different task from that of developing weapons of war and must be treated on a totally different basis.

Science is essential to national security. Nevertheless, when we attempt to extend to pure science the principles of secrecy which go under the name of security rules, we suppress the progress of science. Secrecy imposed upon basic science is inimical to national security. Thus, we have the paradoxical situation that for greatest national security in the field of pure science there must be a minimum of security regulations.

It is unfortunate that "security" and "secrecy" have come to be regarded as almost synonymous. In basic science, secrecy and security are neither synonymous nor even compatible. Unless these things are clearly understood, we will only have confusion when we discuss the program of the Atomic Energy Commission in the field of pure science.

### The Commission's Responsibilities

The Atomic Energy Commission was charged with three responsibilities: (1) the development of atomic energy as a military weapon; (2) the development of industrial applications of atomic energy; and (3) the support of basic science in fields related to nuclear energy.

The third responsibility is a most difficult one for the Commission to fulfill because the policies which the Commission must adopt in forwarding its other two tasks are very different from the ones it must adopt in forwarding basic science.

When the Commission first took office, the atomic energy enterprise was in a precarious position.

The tasks of the Commission at that time, in order of their priority, were *first*, the restoration of the bomb program at Los Alamos; *second*, planning production of fissionable materials upon a sounder footing; *third*, building up the facilities for the development of atomic energy as a peacetime tool.

The final task was the development of the country's facilities for research in the field of nuclear science and allied fields.

Naturally, the Commission gave first attention to its own laboratories.

There are two Commission laboratories which are primarily devoted to basic research; The Radiation Laboratory of the University of California and the Brookhaven National Laboratory on Long Island. Neither is primarily concerned with atomic weapons or with nuclear power.

Yet, because of a small amount of classified work, secrecy restrictions must be imposed even at some cost in speed and effectiveness of the work.

This situation, although unfortunate, is at the present inevitable. I would, however, like to pay tribute to the Commission for the wisdom it has shown in providing, as far as possible, for the atmosphere of freedom in these laboratories, which is most essential to their success.

Science is not strong solely by having one or two large laboratories. The Commission early recognized as a part of its task the stimulation of university research and teaching of nuclear science.

The General Advisory Committee was cognizant of the fact that the Commission was unable to take strong steps toward the encouragement of basic science in universities during the early days. Even so, we, on various occasions, gently reminded the Commission that sooner or later they must direct themselves to this task. They have now made a number of important moves in this direction. The first one was to strengthen the program initially established by the Manhattan District relating to the distribution of radioactive isotopes.

I believe the isotope distribution program has been extremely valuable and has been, on the whole, very wisely administered.

I believe also that the distribution of isotopes abroad was a wise move. Science knows no national boundaries, and the developments of science in Europe will have just as great a value to us as to any other country; indeed probably a greater value because we have greater technological facilities for making use of new knowledge.

A second step was taken when the Commission entered into a cooperative agreement with the Office of Naval Research for the joint support of projects in nuclear physics and in biology and medicine.

The demands upon the Office of Naval Research were much greater than its budget would allow, and the contribution of the Atomic Energy Commission was of far-reaching value.

A third step was the direct support, through contracts of its own, of university research projects.

The cooperative program with ONR enabled the Atomic Energy Commission to get its feet wet in this field while it was setting up a suitable administrative organization to handle the problem more directly.

Universities and scientists feel more comfortable in having a civilian agency with which to work, such as the Atomic Energy Commission.

I firmly believe that one of the best investments the Federal Government could make would be to allow the Atomic Energy Commission not less than $25,000,000 a year for the direct support of university programs in basic science.

## The Fellowship Program

A final step taken by the Commission in fulfilling its responsibilities for the support of science was the establishment of the National Research Council fellowship program.

The Council's fellowships were first established through a grant by the Rockefeller Foundation in the early 1920's. The National Research Council picked the most promising of the young Ph.D.'s in science each year and provided them with stipends to continue their studies in this country or in Europe.

A large share of the leading active scientists of today got their start through National Research Council fellowships. Dr. Oppenheimer was a National Research fellow in 1927 and 1928. Dr. Ernest Lawrence was a fellow from 1925 to 1927. Dr. H. D. Smyth, from 1926 to 1928.

REP. HOLIFIELD: Do you believe that it is possible for the Atomic Energy Commission to continue the fellowships in the field of nonsecret research without the onus that will come upon the Commission's work in cases such as the Freistadt case?

DR. DUBRIDGE: I think it would be most unfortunate to the Commission and to the country if this fellowship program should be abandoned.

REP. HOLIFIELD: How about the FBI clearances in the nonsecret fields?

DR. DUBRIDGE: I think that the initiation of an FBI investigation for all who are being considered for fellowships would be a very bad thing for the country. To extend secret investigations by the FBI to students, undergraduate and graduate, inquiring among their young friends and relatives about their political beliefs, associations, and affiliations would be a very disrupting influence.

It would bring the basic ideas of a police state into American youth. I think this would be a very unfortunate thing, not only to the fellowship program, but for the country as a whole.

If it is government money you are worried about, it would cost thousands of times as much to investigate everybody as to pay a few Communists, even if they did get in. But it is not the matter of money so much, I think, as the principle of the thing; to extend political investigations to young students working in nonsecret fields where there is no question of national security involved at all, I think is contrary to American principles of democracy.

REP. HOLIFIELD: You have no objection to the loyalty oaths, do you?

DR. DUBRIDGE: I think the loyalty oath is a piece of paper which has very little meaning. It will eliminate an occasional naive youngster who is quite willing to admit he is a Communist and still thinks he can be loyal to his country.

It will not eliminate the really dangerous, subversive Communists, who are quite willing to perjure themselves if they think it to their advantage to do so. So it will be reasonable to say: Shall we not go a step further; And a step further will be made, and pretty soon we will have the whole FBI machinery investigating these youngsters.

So while I do not like to see Communists in the fellowship program, I am still more afraid of the methods which would have to be adopted to prevent this.

REP. HOLIFIELD: Because of the explosive public opinion, which is attached to anything having to do with the atomic energy program, it might be necessary to disassociate that field of research from the Atomic Energy Commission and place it, for instance, in a National Science Foundation.

DR. DUBRIDGE: I certainly hope that the National Science Foundation will be promptly established. However, I think for us to retreat, in the face of a public misunderstanding, from a most valuable program would be unwise. I would rather try to make it clear to the public that 99 per cent of the so-called field of atomic science is just as nonsecret as biology or medicine, or agriculture, or metallurgy, or seismology, and that there are no reasons for extending into this vast area, secrecy and security regulations.

REP. HOLIFIELD: It is perfectly possible that if some of these brilliant men that have been educated in these fellowships, if their political and economic views should have been questioned in the days when they were immature, struggling, young scholars, that they might have been eliminated by a rigid loyalty program.

DR. DUBRIDGE: It is perfectly possible, and it is very fortunate that such inquiries were not made at that time. You never can tell where brains will arise. They may arise in association with very curious political ideas, but brains are a national asset, and we should encourage them and support them wherever they are found.

I do not like the idea that we are doing a favor to these candidates by giving them a fellowship. We are doing a favor to the country by developing their skills and their brains and getting a good bargain in spending money to train men who will be important in the future leadership of science.

SEN. MILLIKIN: I wish to take sharp issue with you on that.

The United States, who spends the money, has the right to set the standards by which those men will be chosen. The people of the United States may be misinformed, but they have the notion that the United States should not be spending the taxpayers' money to educate anyone who joins a conspiracy against the United States.

Since that is the basic feeling—and I share that feeling—we are entitled to take steps which are necessary to eliminate the youthful, the middle-aged, or the aged conspirators.

Maybe the Communist oath will not do it. I am inclined to agree with you that if a man is a real Communist, he does not pay any attention to the oath; but people are finding that the crime of perjury has certain perils to it, and it may act as a deterrent.

I have no opinion on whether there should be an FBI investigation, but let me ask you bluntly, what is wrong with an FBI investigation? We are educating these fellows to prepare them for secret work.

DR. DUBRIDGE: That was not my understanding of the purpose of the program.

SEN. MILLIKIN: I suggest that the Atomic Energy Commission has no authority to engage in general aid of science.

DR. DUBRIDGE: It is charged with the encouragement and support of basic science, and stimulation of training of scientists in fields related to atomic energy.

SEN. MILLIKIN: Any part of science has some relation to atomic energy. The business of the Commission is to concern itself with atomic energy.

The purpose of the program is to educate men in nonsecret work with the ultimate idea that if secrecy is then necessary they will be available for secret work.

DR. DUBRIDGE: I think the basic purpose of the fellowship program is the real question before us.

One can never predict in what field of science a result of very great importance to atomic energy may arise.

SEN. MILLIKIN: And one cannot predict which one of these fellows you might want to put into secret work.

Why spend the money on someone who might not be cleared when the day of clearance comes?

DR. DUBRIDGE: Would you rather spend $100,000 in clearing everybody than spend $1,000 in a stipend to one?

SEN. MILLIKIN: I would rather spend several times a hundred thousand dollars to keep any conspirator out of the field of atomic energy.

Tell me what is wrong with the FBI investigation. I would like to have someone make an intelligent comment on it. You said a while ago that it introduces the police state into the life of the young man. It might be better to introduce the police state into the life of some of these young men than to have a police state introduced to the whole United States.

DR. DUBRIDGE: The FBI investigation involves a secret inquiry among friends, relatives, associates, about an individual's political beliefs, his political activities. The men and women who make statements about the candidate remain anonymous. They can make statements without being under oath, without being known to the candidate, and while all of this may be necessary in clearing people for secret work, I just do not think that this is a part of the American democracy in nonsecret fields in education or in any other activities that have nothing to do with national security.

SEN. MILLIKIN: If the secret fields were not connected with the nonsecret fields, I would gladly agree with you.

DR. DUBRIDGE: Then the question boils down to how you are going to separate the nonsecret fields from the secret fields. You mean that the areas which the Commission is charged with supporting must be connected with the secret field, but there is an enormous amount of work in areas related to biology and medicine and nuclear physics, to chemistry, and so on, which the Commission is charged with supporting under the law, but which has no immediate or remote connection to a secret area.

SEN. MILLIKIN: Let us assume that the student is not preparing himself for a secret field. I still suggest to you that the American people might not want to give a fellowship to a fellow who joins a conspiracy against his country.

DR. DUBRIDGE: I realize there is this feeling. I think it is an unfortunate feeling, not because I do not share in a sense the distaste for giving money to a man who is a member of the Communist Party, but I think that the methods that must be adopted to be sure we prevent that are far more distasteful than having an occasional Communist receive a government stipend.

SEN. MILLIKIN: What is this harmful thing resulting from the FBI investigation, which becomes all right when the man starts to enter secret work?

DR. DUBRIDGE: Simply that the secret areas of science are very small, and if the blanket of clearances and security are extended to the whole area of science, you are going to have a very big blanket indeed.

You have already suggested that the National Science Foundation, for example, would be giving government money to Communists unless there is an FBI investigation.

SEN. MILLIKIN: I did not suggest that.

DR. DUBRIDGE: It was suggested in a previous discussion. Public Health scholarships, National Science Foundation scholarships, Agriculture Department scholarships, would have to come under the same regulation.

SEN. MILLIKIN: I do not like to see it either, but I would like to have your reason why there should not be an FBI investigation in terms of the damage that such an investigation does to science or to the young man.

DR. DUBRIDGE: The damage which it does is the damage not only to the individual, but to the country in extending FBI secret investigations to a large area of American life and, particularly, to American youth.

SEN. MILLIKIN: How large would that area be?

DR. DUBRIDGE: There are now 500 National Research Council fellows. There have been hundreds of others who have applied.

SEN. MILLIKIN: Would it be a large segment of American life?

DR. DUBRIDGE: Yes, a very large segment.

SEN. MILLIKIN: Call it a thousand a year. We have almost 150 million people in the United States.

DR. DUBRIDGE: It is a fairly large segment, since it includes universities throughout the country; it includes not only the applicants, but their friends and their associates who will be interviewed by the FBI.

SEN. MILLIKIN: Multiply it by five and you still would not have a large segment of American life. There is a considerable segment of American life that is not involved in scientific matters. And they produce the money that enables us to carry on this scientific program. You had better give some attention to it. How is this young man harmed by an investigation that will determine whether or not he has joined up with a conspiracy against this country?

DR. DUBRIDGE: The harm comes from the very considerable number of perfectly honest and loyal men who will be disqualified on evidence which is inconclusive and possibly even wrong. During the war I saw many people, honest and loyal men, disqualified for employment in war programs on misunderstandings, on incomplete information, some of which might be true and some of which could not be verified.

SEN. MILLIKIN: The responsibility will be in the Commission's hands, and one of the criticisms in this hearing is that the Commission has been excessively liberal in this clearance.

You are dealing with a very small segment of American life. That does not mean that small segment should be persecuted. I am quite a crank on that subject. But it is a small problem in relation to an enormously important subject.

DR. DUBRIDGE: All big things have small beginnings. I am afraid of the results.

SEN. MILLIKIN: Let Congress worry about the ramifications.

DR. DUBRIDGE: A bright individual, who might have an interest in nuclear physics, when he finds that as soon as he gets into that field, he is going to be investigated by the FBI, he is going to be regarded as a dangerous character, will simply say, "Why should I bother

to go into that field? There are other fields of science."

So that the field of nuclear physics might be weakened by diverting the best brains of the country to other fields which might not be so critical to national welfare.

REP. HOLIFIELD: The relation of the thousand students to the 150 million people, I submit that is a clear misapplication of logistics. The application, it seems to me, should be the ratio of the thousand young men to the number of people engaged in scientific research. That is the legitimate comparison. Already this thing is spreading, and in the House an attempt is being made to write this thing into the National Science Foundation bill. How far it will be brought on the floor of the House by some hysterical member, I do not know. He may demand a complete FBI investigation of every individual who participates in the National Science Foundation.

DR. DUBRIDGE: Every disaster has started in a small way.

REP. HOLIFIELD: They eliminated the Masons in Germany and then the labor unions. They went from one thing to another and finally liquidated everyone who opposed Nazism.

SEN. HICKENLOOPER: It is the infiltration of those who conspire against the United States, who start in a small way and are brushed off with indifference, that lays the basis for the success of the conspiracy later.

DR. DUBRIDGE: I did not suggest that the FBI should reduce in any way its activities for getting after subversive Communists wherever they are found. That is a job which the FBI should be continually pursuing.

SEN. HICKENLOOPER: When they do, there is a very vocal segment in this country which begins to pooh-pooh and belittle the FBI's investigation, to defend these subversives who are uncovered, and, unfortunately, we are too apathetic about it.

DR. DUBRIDGE: I do not defend that point of view. When proof is brought out by the FBI about subversive activities, I think all normal legal channels for punishment or elimination of such dangerous individuals should be found, but to find such individuals in the field of fellowships, involves the bringing in of an FBI investigation in a sweeping way, which I think is dangerous to American democracy.

SEN. HICKENLOOPER: I favor the fellowship program of the Atomic Energy Commission. It is the administration and the methods of selectivity that I oppose; and I was surprised to learn that they were going into all fields of basic science, which was not my understanding of the fellowship program.

It was my early understanding that the justification for the fellowship program was to educate young scientists who would form a reservoir which eventually can be dipped into as the need arises to further the vital things of atomic energy.

I am wondering if there is not a greater science from the standpoint of immediate importance than all the rest of them, and if that is not the science of government.

Government can close every laboratory in the United States or the world. It has closed the laboratories to free thought and free investigation in other places. The science of government is the thing that keeps the laboratories open and free and keeps research available for the advancement of people.

Now, in our Government we do not believe in nurturing people in the government activities who conspire to destroy the very system that we want to keep alive. It would seem to me that in science there would be similar resistance among the scientific people themselves to the nurturing of people whose conspiratorial attitude is to destroy the very free system which keeps their laboratories open.

DR. DUBRIDGE: That is right, I hope you do not feel that any statements which have been made by scientists or by myself in regard to this FBI clearance is in any way an attempt to defend subversive activities of any sort.

We believe there are mechanisms in our Government for hunting out offenders and proper methods of punishment or elimination of them from this country, but we feel hysteria caused by a fear of Communists can introduce into our own democracy some of the very things we do fear in Communism, namely, the police-state methods, the review of political opinions, the purge of scientists, and the purge of other people, too, on the basis of political ideas.

How many of these people who are said to be Communists or fellow-travelers simply have a sort of political feeling, usually on the basis of youthful naivete, that here is something new they wish to explore?

They will get into it and get sick of it in a couple of years and be better and more loyal American citizens perhaps as a result of their practical introduction to the Communist conspiracy. It is not as though these people are permanently tied up and are forever subversive citizens. Let's do not extend police-state methods to a large section of American life in the hysterical fear that one or two such fellows are going to overthrow the country. I do not think they will.

SEN. HICKENLOOPER: I think that minimizes the entire pattern of Communist infiltration.

I also suggest that every time some person with a questionable background is given a fellowship, some young American against whom there is nothing, is precluded from having a fellowship.

Freistadt was a brilliant man, but he was not at the top of his class.

DR. DUBRIDGE: I did not mean to imply that the only brilliant brains are those of Communists—far from it. There will only be an occasional Communist in the fellowship program, and it is for that reason that to extend to everybody these FBI investigations is so dangerous. The point is that there is only an occasional brilliant mind, too. The great discoveries of science have been made by a small handful of people. We never know where those brilliant brains are going to be found.

The point is that the best we can do is to judge the most suitable candidates for fellowships on the basis of their intellectual capacities, intellectual promise, normal honesty and integrity, and not on the basis of their political beliefs, and then we will have the best chance of supporting the best brains and not of eliminating some of the best ones.

THE CHAIRMAN: If it is the eventual determination of the Congress, that a full FBI investigation shall accompany the oath, I think scientists ought to take cognizance of the fact that students are being placed in the category of employees of the Commission, bearing the same burdens as the stenographer or janitor who is working in nonsecret work.

I am desperately concerned that the scientists of the country do not get the idea that we are marking them out for special loyalty treatment.

DR. DUBRIDGE: Until the fellowship program and some of these university contracts came up, the activities of the

AEC were pretty largely confined to laboratories and production centers in which secret work was going on and in which everyone from the director to the janitor had to be cleared.

If it is going to extend its activities into the fields of basic science, into the universities, then it must, I believe, set up different policies for treating either employees or fellows or anyone else.

It might clarify the situation if the AEC was told it was to carry on no nonsecret work, but this would be very damaging to the country and to the AEC because a lot of these nonsecret fields are of very great importance to our activities in nuclear science and atomic energy itself, and it is quite important that the AEC be in contact with those areas.

May I add one word about the areas of science in which fellowships have been awarded?

The General Advisory Committee has been asked by the Atomic Energy Commission to advise it on these areas and it has been our policy to interpret the Act broadly.

We have recommended that activities in the field of biology and medicine and metallurgy, and so on, be supported and that fellowships be given in those fields.

We also recognize that when and if a Science Foundation is created, the activities of AEC could be narrowed, but it is not created yet, and offices like the Office of Naval Research and the Atomic Energy Commission have been very wise to extend a broad base of support to science.

## DR. FERMI

DR. FERMI (Member of the General Advisory Committee) reviewed the progress of the Commission in weapon production, production of fissionable materials, and procurement of raw material. He continued:

There are, then, peacetime activities, and, of those, the one that has received the greatest attention is the problem of reactors for power production.

At the end of 1946, one thing was clear—that energy could be produced—after all, energy had been produced. It was not clear to anybody how energy could be produced in a reasonable way except for the fact that it was the general consensus of opinion that the problems would be solvable.

I have the impression that the general trend at that time was to underestimate the difficulties which are not of a theoretical nature, but are practical.

The solutions weren't immediately at hand and, unfortunately, are not yet at hand, and in spite of that, I would want to go on record with the statement that very substantial progress has been made in ironing out that very great mass of detail which, in solving a technical problem of this magnitude, really constitutes the core of the question.

I would not want to be misinterpreted. I do not expect startling industrial results at least for very, very many years to come, but I am reasonably confident that, in the not too distant future, there will be something more concrete to point to than general technical progress.

### How Science Is Promoted

Finally, I would like to say a few words as to the promotion of science.

I share the view of the previous witness that science should be meant in a not too strictly utilitarian meaning. To attempt to foresee what science will be "useful" and what will not be "useful" would require much more knowledge of the future than any of us can have.

For this reason, I have been very much in favor of the actions of the Commission in supporting general science in collaboration with the Office of Naval Research, in supporting basic science in the laboratories of the Commission, and in supporting education in the field of science. I shall have to repeat some of the arguments of Dr. DuBridge as to the present controversy on clearance of applicants for fellowships.

The argument has been raised that a person who is loyal should not be distressed if such loyalty is checked. This is probably true from a somewhat theoretical standpoint. From a practical standpoint—and I have seen very many cases of such investigations—it is my duty to state that such investigations are usually carried out in a very considerate manner.

I believe the questions that are asked are fair. FBI agents come to see me every once in a while to ask me, "Do you know anything about Mr. So and So?" There is never, in my experience, any attempt to cause me to make damaging admissions.

I know a great number of students and young men in science, and I notice just a general pre-occupation. After all, science is a matter of investigation into mysteries, and scientists are people who have a natural curiosity, who have thought that way professionally, and are in a sense thought to be good scientists if they are very prone not to take anything for granted.

SEN. HICKENLOOPER: Is there any criticism then against those who have the responsibility for Government to not take anything for granted and to be very sure in investigating the mysteries of people's subversive beliefs?

DR. FERMI: That is a very good question. I am afraid I have no answer.

Suppose it is a young man and he has seen very little of life; he has a certain natural curiosity. Supposing he says, "They tell me the Communists are so bad. All right, let's see what they are; let's take the *New Masses*"—or whatever is their official publication—"and I shall just see what they say for themselves."

An attitude of this kind is something I would view with some sympathy. After all, why not? Why should not a young man get enough information to be disgusted by himself at what he may read?

Now, the landlady sees the *New Masses* lying around; comes the FBI agents; the landlady says, "Well, yes; he is a nice chap," and there the man goes on record as a very dangerous character who had better be kept out of the ranks of the loyal American scientists.

I understand the philosophy of the inquiry is not to spot necessarily an offender but to detect a risk—well, to be considered a poor risk is no irrelevant matter for a young man who has not had a chance to be established.

There are false rumors as to how much police methods are adopted in such inquiries, but after all people react to things for what they believe them to be and not necessarily for what they are.

The impression is abroad to some extent that on the slightest hint of the janitor or the landlady or whoever may have the occasion to look into your wastepaper basket—you may be branded, and you may find at least that it is very difficult, and, at least, very unpleasant, to clear yourself.

That makes for a very unhealthy feeling. I spotted in the schools that sometimes young people are just not quite frank. They do not talk with that complete carelessness which I believe should be a privilege of young men of that age.

### The Price of Secrecy

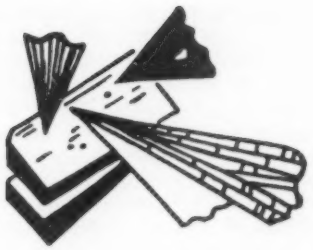
For this reason, I want to endorse most strongly the views mentioned this

*(Continued on page 254)*

# CONTROL OF ATOMIC ENERGY: AN INTERNATIONAL PROBLEM

*Frederick H. Osborn*

Deputy U. S. Representative to the United Nations
Atomic Energy Commission



ON AUGUST 6, 1945, four years ago, the atomic bomb was dropped on Hiroshima. In announcing this action, the President of the United States issued a statement which ended with the words, "I shall make further recommendations to the Congress as to how atomic power can become a powerful and forceful influence towards the maintenance of world peace."

On the same date, Mr. Henry L. Stimson, the Secretary of War, announced the appointment of an Interim Committee of officials and eminent American scientists to "make recommendations (to the President) with regard to the problems of both national and international control."

On October 27, 1945, the President said in his Navy Day address: "The highest hope of the American people is that world cooperation for peace will soon reach such a state of perfection that atomic methods of destruction can be definitely and effectively outlawed forever."

Within less than a month, on November 16, 1945, the President of the United States, the Prime Minister of the United Kingdom and the Prime Minister of Canada, meeting in Washington, issued a three-nation agreed declaration on atomic energy in which they proposed that a Commission should be set up under the United Nations organization which should make specific proposals:

a) for extending between all nations the exchange of basic scientific information for peaceful ends;
b) for control of atomic energy to the extent necessary to ensure its use only for peaceful purposes;
c) for the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction;
d) for effective safeguards by way of inspection and other means to protect complying states against hazards of violation and evasions.

Finally, on December 27, 1945, Messrs. Byrnes, Bevin, and Molotov, meeting in Moscow, announced the agreement of the United States, Great Britain, and the Soviet Union to the establishment of an Atomic Energy Commission to the United Nations, with these terms of reference.

The Commission was in due course created by the General Assembly, and at its first meeting on June 14, 1946, Mr. Bernard M. Baruch presented certain United States proposals for the international control of atomic energy.

In almost continuous meetings during the next six months, these and other proposals were discussed, the principles of control were hammered out, and finally, on December 31, 1946, the Commission issued its First Report laying down the general principles which in its judgment would make effective control possible. Ten nations voted in favor of the Report. The Soviet Union and Poland abstained. The high point of Soviet cooperation had evidently been passed.

In the two and a half years which have passed since then the Soviet delegates have consistently and progressively moved further away from the principles which the majority considered the necessary basis for an effective control. Yet it seems to all of us on the Commission that the suspicions and international rivalries which make atomic energy so dangerous to the peace cannot be quieted except by strong methods which must include international management, operation, and ownership of dangerous activities; continuous and effective international inspection for clandestine activities; continuous publication of research, so that there should no longer be any secrecy in this field, and by putting such a treaty into effect step by step, each step towards prohibition of atomic weapons being accompanied by a corresponding step towards control.

An address given before the In-Service Training Course on Atomic Energy, in New York, May 4, 1949.

In February 1947, General Marshall, under whom I had served during the war, invited me to become Deputy Representative of the United States on the United Nations Atomic Energy Commission. I asked General Marshall whether in the then existing state of the world tension he felt that the United States should turn over its secrets and all its atomic plants to an international atomic energy control body in order to bring about the effective prohibition of atomic weapons. His reply was illuminating. General Marshall said that this was not a weapon for democracies; that its continued existence in the world would threaten the very basis of free government because it would sow suspicion, fear, and distrust. A race in atomic arms would eventually require considerable restraints on freedom of information and the free movement of people, and such restraints must be avoided in a democracy. He felt that we must take the long view, and play for the larger stakes, seeking international cooperation and control, provided we could be assured that these weapons would never fall into the hands of others when we no longer had them.

This expression of General Marshall's views made a very deep impression on me. They convinced me of the deep sincerity of the American proposal, for I knew that General Marshall had been in constant touch with Mr. Stimson and President Truman on these matters, and anyone who has known General Marshall knows the sincerity with which he speaks. This large conception of the basic problems has impressed me increasingly during two years of study and negotiation.

THE atomic weapon and the means of delivering it are enormously expensive. In a very real sense atomic bombs are the culmination of the process which started with the machine gun and the armored naval vessel, and has gone forward with the aeroplane

and the armored tank to the strategic bomber, radar control, nad the guided missile. The weapons of today, of which the atomic weapon is the climax, are weapons of centralized power. Their combined cost is enormous. They can be developed and used only by large and powerful governments. In the hands of any determined group of men they can be weapons of coercion without parallel in human history. This, it seems to me, is the danger of the atomic bomb; that in the wrong hands it can destroy freedom. Because of this danger, the very existence of atomic weapons causes such fears and suspicions and international rivalries as to threaten not only the peace but, worse still, that freedom of information, of movement, and of persons, which is essential to popular government. As long as such weapons exist they will create fear and, from time to time, intense and dangerous rivalries for their possession.

The foreign policy of the United States is not one which looks for a centralization of power. The Western European tradition which we have inherited emphasizes the value of the individual and his participation in government. It is a tradition of progress by evolution, and not by coercion. The world which we envision and towards which our foreign policy is directed is a world of politically independent sovereign states, cooperating together through the United Nations to maintain the peace and improve the conditions of human life. If our search for security should ever lead us to abandon this ideal and seek instead a peace enforced by a centralized world power, we would have given the aspirations of six thousand years of civilization as hostage to a responsibility which neither we nor the other two and a quarter billion of the world's peoples are capable of assuming.

IN SEARCHING for a solution of the atomic problem, the members of the United Nations Commission have discarded the idea of centralized power. They have developed instead a plan requiring the cooperation of politically independent states on a basis so comprehensive, and so advantageous to each participating state, that the very elimination of atomic weapons would have as an inevitable by-product the closer knitting together of the world's peoples.

In the language of the Third Report of the Commission, "the new pattern of international cooperation and the new standards of openness in the dealings of one country with another that are indispensable in the field of atomic energy might, in practice, pave the way for international cooperation in broader fields, for the control of other weapons of mass destruction, and even for the elimination of war itself as an instrument of national policy."

THE plan worked out in the United Nations Atomic Energy Commission over the past three years has been approved by all of the past and present members of the Commission with the exception of the Soviet Union and its associated states. It has been approved by the General Assembly of the United Nations in its meetings last fall by a vote of 46 to 6, forty of the affirmative votes being cast in the Plenary Session and six additional affirmative votes being cast in the Political Committee. Only the Soviet Union and its associated states voted in the negative.

The plan accepted by the U.N. Assembly contains the following features:

1. It would "prohibit the manufacture, possession and use of atomic weapons by all nations parties to the treaty and all persons under their jurisdiction."
2. The world's total supplies of uranium and thorium ores would be held in trust for the equitable distribution among all nations of their peaceful benefits.
3. All information of a scientific, technical, engineering or manufacturing nature would be freely interchanged among the scientists and engineers of all nations and currently published so that there would no longer be any secrets in this field.
4. The proportion according to which each nation would share in world supplies of available atomic materials for peaceful purposes would be written into the treaty in the form of quotas, fixed in advance, but presumably based on some index of equitable distribution which would change automatically with changes in the bases of that index.
5. Each nation would have the right, when atomic power is available on an economic basis, to require the international agency to provide power for it up to its quota, provided proper consideration of security and financing are met.

These, in brief, are the affirmative features of the Commission's plan. They require certain of the participating states to make heavy sacrifices in order that the plan may be fair to all nations. Nevertheless these states have voted approval of the plan and the Soviet Union itself is not protesting these features which would so evidently be of benefit to it.

The protest of the Soviet Bloc is against the methods which the Commission has found necessary in order to make such a plan effective and maintain the prohibition against atomic weapons.

IN ORDER to make the plan effective the majority of the Commission maintain that the proposed international agency must, in the sense of a trustee for all signatory states, own all uranium and thorium ores when taken out of the ground, and must own, operate and manage all plants for processing ores and for making fissionable materials in dangerous quantities, and must own all nuclear fuel. The Commission feels that an international agency which did not have these rights of ownership but had to impose decisions with respect to nationally owned materials, and on plants under national management, would become involved in serious conflicts of authority, and that these conflicts would inevitably prevent carrying out the terms of the treaty establishing a control system; while at the same time if plants were owned by nations it would be almost impossible to prevent diversion of materials.

In order to prevent clandestine and prohibited activities, even under a system of international ownership, it would be necessary to have a thorough and continuing system of international inspection by international personnel, and in order to assure that there would be no secrets in the field of atomic energy the agency would publish full reports on all research activities of nations and individuals as well as of the agency itself.

Finally, it is evident to the Commission that "control" is not something which can be accomplished immediately. The setting up of an international authority, the organization of a system of inspection, the transfer of ownership and management of large operations can only be a gradual process. It is equally evident that no single step towards prohibition would have reality without a corresponding step towards control, just as full prohibi-

tion cannot have reality until accompanied by full control. The process of putting both prohibition and control into effect concurrently, step by step, until full prohibition and full control are reached, appears inevitable in any form of treaty.

These, in summary, are the methods the Commission has found necessary to make the plan effective. It is these methods to which the Soviet Union objects. There has been violent objection to the formation of an international cooperative which would exercise the prerogatives of ownership as trustee for the signatory states, operate and manage all dangerous activities, and supervise, under license, all non-dangerous activities. There has been violent objection to a continuous, complete, and effective system of survey and international inspection. There has been violent objection to putting any system into effect step by step, each step towards prohibition being accompanied by a corresponding step towards control.

Yet without employing these methods no one has been able to suggest how a plan that has any hope of being effective could be set up and kept effective.

A complete statement of the recommendations of the United Nations Atomic Energy Commission as approved at the Third Session of the General Assembly is to be found in the working paper of the United Nations Atomic Energy Commission prepared by the United Nations Secretariat under date of April 5, 1949, AEC/C.1/77/Rev.1.

THIS, then, is the situation as it stands today. A quite detailed plan of prohibition and control has been prepared by the United Nations Atomic Energy Commission and approved by an overwhelming majority of the General Assembly. The Soviet Union refuses to accept the methods by which alone the majority believe the plan can be made and kept effective. Under the instructions of the General Assembly the six sponsoring powers (the five permanent members of the Security Council plus Canada) are to consult in order to determine if there exists a basis for agreement, and the Atomic Energy Commission is to continue to survey its program of work and to proceed to the further study of such of the subjects remaining in the program of work as it considers to be practicable and useful.[1]

So far the Soviet Union has maintained its position that only its own proposed solution is acceptable. Under the Soviet plan nations would continue to own, operate, and manage all atomic activities. The Soviet plan proposes an international control agency which would have powers of "periodic" inspection. It would "make recommendations to governments on the questions relating to production, stockpiling and use of atomic materials and atomic energy," and it would "make recommendations to the Security Council on measures for prevention and suppression in respect to violators of the conventions on the prohibition of atomic weapons and on the control of atomic energy." (The Soviet Union insists that the rule of unanimity in the Security Council cannot be modified. The veto could be used to prevent making such recommendations effective). A full statement of the Soviet plan is contained in the Second Report of the United Nations Atomic Energy Commission, together with the reasons why it was not found acceptable to the majority of the Commission.

This necessarily brief account cannot give any adequate impression of the difficulties which have been faced by the sincere and hardworking majority members of the Commission during the past three years. Important concessions were made during the preparation of the Second Report. It was agreed at that time that the quotas for each nation should be written into the treaty itself so that the international agency should be deprived of any arbitrary powers. It was agreed that no nuclear fuel would be made except for beneficial uses in plants actually under construction, thus removing the threat of these materials being available for illegal use during that very considerable number of years which must elapse before nuclear fuel can be used economically for power. These changes, which were proposed by the French and British delegates respectively, provide great protection to all signatory states. They make of the agency a truly international cooperative. But unhappily they brought no change in the bitterness of the Soviet denunciation of the plan. The majority members of the Commission are forced to believe that for the present at least the Soviet Union considers the international control of atomic energy a peripheral problem which they do not desire to negotiate seriously unless and until they decide to take a cooperative part in world affairs.

[1]On July 29 the Commission voted to suspend further study of the Control Problem until the sponsoring powers met and reported that a basis for agreement exists.

It is not likely that a so-called compromise at this time would change the present position of the Soviet Union. And since the compromise would have to be on the methods by which the plan was to be put into effect, a compromise on these matters would endanger the whole purpose of the plan. Any plan which was not considered as effective as possible would inevitably lead to a continued distrust between nations. Instead of removing this threat to the peace, it might actually increase it. No responsible nation would desire to be a party to a plan which had preventable loopholes by which atomic weapons could fall into the hands of an irresponsible group of men at such time as they are no longer available to other nations. No compromise is acceptable which would in any degree weaken the methods at present proposed, or substitute other methods which would be even less effective.

THE situation is one requiring firmness and great patience. But we cannot admit that it is altogether without hope. An interesting change has been taking place in the attitude of the non-Soviet nations. A year ago many of the smaller nations felt that there was a struggle going on between the Soviet Union and the United States which was not their business and in which they did not need or desire to take part. This attitude was reflected in the votes cast on political questions at the General Assembly held in New York in the autumn of 1947. At that time a large number of nations voted with the Soviet Union on many important questions, so that the final votes were in terms of 20 to 30 or 15 to 25, with the Western nations in the majority, but not overwhelmingly so. In the plenary session of the General Assembly held in Paris in the fall of 1948, many nations, including particularly the Scandinavian countries, came to the Assembly with the same general attitude. Mr. Vishinsky's proposals for the disarmament of the Western powers without a corresponding reduction in the arms of the Soviet Union and its associated states, the violence and unreality of his statements, the specific quality of his attack on self-government and peaceful cooperation among nations, completed a transformation which had been going on since shortly after the war. Without exception, the smaller states apparently came to the conclusion that the Soviet threat was a threat against

all peoples aspiring to freedom and independence and the maintenance and peaceful evolution of their own established forms. Not a single nation voted with the Soviet Union and its five associated states on any political question. The votes were always 40 to 6, 46 to 6, 50 to 6. It was a shock to the orators of the Soviet group. They lost all their fire. Vishinsky himself lost his audience and, to a noticeable extent, his self-possession.

It is very evident that even the men in the Kremlin recognize the danger of a wholly adverse world opinion. Even though they control all sources of information to their own people; even though the Soviet people hear only the words of Vishinsky and Molotov and Gromyko, and never hear the calm and reasoned arguments of General McNaughton of Canada, who has been the leader in the atomic energy group, or of Mr. Spaak of Belgium, speaking for the great tradition of individual freedom; still we must hope that the people of the Soviet Union have some reservations about what they are told.

The prospects for obtaining effective international control of atomic energy depend on the opening up of the Soviet Union. No effective control is possible without a full exchange of information, and freedom of movement on the part of international personnel. Every act of the men of the Kremlin indicates that they are afraid to raise the Iron Curtain of secrecy lest a more informed people make unfavorable comparison of their own lot with that of people in other countries. We may fairly hope that this veil of secrecy cannot be maintained forever. When it is lifted, we will have effective international control of atomic energy. Probably, not before.

## The Great Inquiry

*(Continued from Page 250)*

morning by Dr. DuBridge, that loyalty investigations should be looked upon as necessary evils. To expand them into a field in which there is, in my opinion, no very clear necessity—it is true that the taxpayer's money goes for a purpose which would not be endorsed by the taxpayers, but it is not much money, and avoiding that fraction of 1 per cent of risk thwarts—well, makes all the program less effective and less generous and less appreciated than it could be. I believe the price is just too high.

THE CHAIRMAN: If we had been successful in our efforts to get an international control agreement, would you say that would have speeded up the peacetime achievements in atomic energy?

DR. FERMI: I think probably yes, and for the following reasons: I believe that the atomic development suffers under the necessity of a tight secrecy policy. Unfortunately, the peacetime applications are all wrapped up in the same package or very closely with the wartime applications.

This secrecy acts as a tremendous brake on progress. If I may give you an example, I am teaching a course in nuclear physics at the University of Chicago, and I would have liked to have given my students a certain background to lead them close to atomic energy.

I have a fair notion of what is classified and what is not classified, but still the feeling that I would have had to weigh my words very carefully—I could have been asked embarrassing questions, and I would have been faced with the choice of telling a student in the open classroom, "I am sorry, my boy, but this is something that I am not allowed to answer"—and this uneasiness sort of drove me—after all, nuclear physics is a very wide field—it drove me to stay somewhat off the subject.

There you have some fifty boys who have lost that minimum chance to acquire a training directly in that direction.

Also, at present in very many foreign countries, people do not even think along the direction of atomic power, because they say, "There is this American monopoly, and they keep everything wrapped up in secrecy."

The feeling is that in basic science much more is kept under wraps than actually is necessary. The feeling of this blank wall, and nobody knows exactly where the wall begins, how far one can go without overstepping the limits, acts as an extremely serious psychological block against what would be a very natural and appropriate field for free investigation.

### CONCLUSION OF THE OPEN HEARINGS
### July 11

On July 11, the last two witnesses for the Commission (DR. SHIELDS WARREN, director of the AEC Division of Biology and Medicine, and DR. ALAN GREGG, chairman, Advisory Committee on Biology and Medicine) gave an accounting of the work of the Commission in the fields of biology and medicine.

The work of the AEC in biology and medicine is the main topic of the Commission's Sixth Semiannual Report, issued on August 1, 1949. Presentation of this report will give the *Bulletin* a better chance to summarize the progress in this field.

After MR. VOLPE, the General Counsel of the AEC, had presented some additional documents including the correspondence between AEC and Military Establishment after the conclusion of Eniwetok tests, and documents pertaining to the history of the emergency clearance (see pp. 222-23), the chairman, SENATOR MCMAHON, said:

Now, we have had 23 open hearings; we have had 14 hearings in executive session, for a total of 37.

This unfortunately, does not conclude the investigation.

We have the personnel security cases, and I have scheduled an executive meeting to begin a discussion of how they are to be handled.

## Statement on Fellowships

*(Continued from Page 210)*

member of the Communist Party might receive a fellowship. But even the proponents of the proposals do not contend that security will be thereby endangered, for the holder of the fellowship has no privileges in regard to classified information. If after completing his studies the fellow wishes to work for the Government he will be subjected quite properly to a thorough check which will reveal his affiliations if he is a Communist, and he will be rejected. At the worst, the Government will have then spent its money on a man who can not be used for the furtherance of the national security. It should be noted in passing, however, that as a purely financial matter the amount of money thus wasted on the occasional awarding of a fellowship to a member of the Communist Party would be more than offset by the additional expenses required for FBI clearance of prospective fellowship-holders. But, leaving aside the question of cost to the Government, we submit the risk that a very few Communists may receive training though an open and uninvestigated fellowship program represents a negligible loss, as compared to the bad effects on the spirit of our nation which would result from a further extension of counter-espionage methods to those of college age.

*—Signed*

Dr. J. Robert Oppenheimer, Chairman; Dr. Oliver E. Buckley; Dr. James B. Conant; Dr. Lee A. DuBridge; Dr. Enrico Fermi; Dr. I. I. Rabi; Hartley Rowe; Dr. Glenn T. Seaborg; Dr. Cyril S. Smith.

# UNITED NATIONS ATOMIC ENERGY NEWS

*Francis W. Carpenter*

Mr. Carpenter, who reports the activities of the United Nations Atomic Energy Commission for the BULLETIN, is a member of the staff of the Associated Press. He has covered the work of the UNAEC since its first meeting in June, 1946.

THE DEBATE in the United Nations Atomic Energy Commission has shown no sign of a break in the three-year stalemate.

The Commission met on May 25 and referred the General Assembly resolution of November 4, 1948, on atomic energy, and the Soviet proposal of February 25, 1949, to the Working Committee. No one objected to sending the Soviet proposal down to the Committee, but the Soviet Union and the Soviet Ukraine objected to sending the Assembly resolution. This resolution called on the permanent members to consult and on the Commission to develop more ideas for atomic control based on the majority-approved plan.

On June 1, the Working Committee approved two documents drawn up by the Secretariat at the suggestion of the Commission. The vote was 9 to 2, the Soviet Union and the Soviet Ukraine still insisting that the work was unnecessary. The documents were:

1. A working paper giving the recommendations for the international control of atomic energy and the prohibition of atomic weapons as approved by the UN Assembly in Paris on November 4, 1948.

2. An index to the contents of the three reports of the Atomic Energy Commission.

The Secretariat also distributed in printed form Volume I of the *International Bibliography on Atomic Energy* (Political, Economic, and Social Aspects). Volume II has been completed in mimeographed form.

Parts III and IV, dealing with the biological and medical effects of high-energy radiation and isotopes in biology and medicine, respectively, were issued September 17, 1948. Parts I, II, and V, dealing with fundamental nuclear science, the physics and engineering of nuclear reactors, and applications of radioactive tracers in non-biological sciences and technology, were issued on February 14, 1949. Dr. O. Frey, Chief of the Atomic Energy Commission group of the UN Department of Security Council Affairs, says that Volume II will be issued in printed form in October, 1949.

The final round of an attempt by the West to draw the Soviet Union out on new points began on June 3, in the Working Committee meeting. Frederick Osborn, United States delegate, opened the debate.

## MR. OSBORN'S SPEECH, JUNE 3

"I have already stated in a previous meeting," he told the Committee, that the United States is ready and anxious to discuss very fully any Soviet proposals which give hope of opening grounds of agreement in this Committee or in the Commission.

"We do not feel that the Soviet resolution now before us is of that nature. It proposes that the Commission begin immediately the preparation of two draft conventions, one on prohibition and one on control, to be concluded and put into effect simultaneously. The wording of this resolution is such as to make it appear that there is something new in the idea of conventions put into effect simultaneously. But an analysis of the proposal in the light of the previous work of the Commission makes it clear that this is simply the continuation of Soviet attempts to define the stages by which the plan of prohibition and control would go into effect."

Later, Osborn said: "The representative of the Soviet Union, in the forty-fifth meeting of the Working Committee on June 1, again indicated that the proposals of the Soviet Union of June, 1946, and June, 1947, should be studied as a basis for the elaboration of these two draft conventions. These two proposals have already been studied at great length by the Commission and its Committees, which have found them inadequate, as a basis for the work of this commission, and have so reported to the Security Council and the General Assembly.

The position of the United States on these proposals has been authoritatively stated in the reports of the Commission, for which the delegate of the United States, and, indeed, the delegates of the majority of the other nations represented on the Commission, have already voted. It seems to me that no useful purpose would be served by repeating now the debates which took place during the preparation of these reports."

Sir Terence Shone, of the United Kingdom, and Dr. H. R. Wei, of China, took a similar position. Francois de Rose, of France, also holds this view.

## MR. MALIK'S REPLY

Jakob A. Malik, Soviet Deputy Foreign Minister, answered with a long statement:

"It is not because the Soviet Union has introduced proposals for the immediate preparation of two draft conventions that we are marking time, but because the United States of America is departing from the need for the prohibition of the atomic weapon and does not desire to start the preparation of two conventions on prohibition and control.

"This is the gist of the matter," Malik said, "and references to technical considerations are invalid." He went on:

"We are asked on what basis, since no new basis has been presented, we make our proposal. Let us try to work on it; let us try to prepare a convention; let us try to find an agreed decision which will be acceptable to all, not only to one particular group of states.

"We are constantly being threatened with the need for something new. You demand something new, but what have you presented that is new, you of the majority? I have heard nothing from you that is new. We agreed with the imposition of immediate strict control. We agreed not only to periodic inspection, but to constant inspection. We agreed to the immediate implementation of the convention on prohibition

and control. You insisted on this, and you gave us to understand that you were categorically against having the prohibition convention put into effect first, and only after that, the convention on control.

"We always supported the position that only the conclusion of the convention on the prohibition of atomic weapons can and should be the first step towards the establishment of control and for various measures of control that would in turn realize properly the implementation of the first convention. We were always of that opinion and we continue to support it.

"Trying to meet halfway the opinion of the majority, trying to find an agreed decision at the last session of the General Assembly, we did arrive at a compromise. We conceded the immediate establishment of the implementation of the two conventions. This was something you asked for and you got it. We took a decisive step towards meeting you halfway. But what have you done? Nothing. You have grasped the Baruch Plan, and you do not wish to deviate one step from it. It is not control; it would mean ownership, but it is in accordance with the desires of the United States monopolists who would like to own everything on this earth and probably everything on Mars. We cannot agree with this, and we are sure that those states which respect their sovereignty will not agree."

## DR. WEI'S PROPOSAL

Dr. Wei had sat patiently through all the debates, waiting and watching for the Soviet Union to develop its ideas more fully. He then made this proposal:

"The Working Committee has considered, at the request of the Atomic Energy Commission, the proposal of the representative of the Union of Soviet Socialist Republics that the Atomic Energy Commission begin immediately to prepare a draft convention for the prohibition of atomic weapons and a draft convention for the control of atomic energy, proceeding from the principle that both conventions must be concluded and put into effect simultaneously.

"Has noted the statement of the representative of the Soviet Union at its forty-fifth meeting on Wednesday, June 1, 1949, that the proposals submitted by the representative of the Soviet Union on atomic energy in June, 1946, and June, 1947, should be taken as a basis for the elaboration of these draft conventions.

"Recalls that these same proposals, particularly those of June 11, 1947, have already been analyzed in detail and rejected in April, 1948, on the grounds that 'they ignore the existing technical knowledge of the problem of atomic energy control, do not provide an adequate basis for the effective international control of atomic energy and the elimination from national armaments of atomic weapons, and, therefore, do not conform to the terms of reference of the Atomic Energy Commission.'

"And recalls that the Soviet proposal for the preparation of a draft convention for the prohibition of atomic weapons and a draft convention for the control of atomic energy to be concluded and brought into effect simultaneously was rejected by the General Assembly at the 157th Plenary Meeting in its Third Session on 4 November, 1948, by a vote of 40 votes to 6, with 5 abstentions.

"And recalls also that at the same time the General Assembly approved the General Findings (Part II C) and Recommendations (Part III) of the First Report and the Specific Proposals of Part II of the Second Report of the Commission, as constituting the necessary basis for establishing an effective system of international control of atomic energy to ensure its use only for peaceful purposes and for the elimination from national armaments of atomic weapons in accordance with the terms of reference of the Atomic Energy Commission.

"The Working Committee observes that no material has been presented additional to that previously submitted to the General Assembly, the Commission, or the Working Committee.

"The Working Committee therefore concludes that no useful purpose can be served by further discussions in the Working Committee of those proposals which have already been considered and rejected by the appropriate organs of the United Nations. The Working Committee reports to the Atomic Energy Commission accordingly."[1]

Members of majority delegations on the Committee hoped to vote on June 7, but Vasily A. Tarasenko, Soviet Ukarine, asked for a delay so that he could prepare a speech on the issue. Mr. Osborn opened the June 7 debate as follows:

[1]This resolution (with the word "Commission" substituted for "Working Committee") was approved by the Commission on July 29; the vote 7 in favor, 2 against, and 2 abstentions (Argentina and Egypt).

## MR. OSBORN'S REMARKS, JUNE 7

"I shall not read again the resolution of the General Assembly of 4 November, 1948, which is before the Committee, and which is the basis of my remarks.

"I first want to ask a series of questions of the representatives of the Soviet Union and the Ukraine. I shall put these questions under three headings: prohibition, control, and stages.

### Prohibition

"If the members of the Working Committee will turn to the United Nations plan of control as approved by the General Assembly on 4 November, 1948 (Document AEC.C. 1/77 / Rev.1, Chap. 10, p. 51), they will then find the following:

> The treaty of convention should include provisions for:
>
> Prohibiting the manufacture, possession, and use of atomic weapons by all nations parties thereto and by all persons under their jurisdiction;
>
> Providing for the disposal of any existing stocks of atomic weapons and for the proper use of nuclear fuel adaptable for use in weapons.
>
> The following shall be prohibited to nations and persons:
>
> (a) The use of nuclear fuel in atomic explosions or for the development, production, or assembly of any atomic weapon;
>
> (b) The use of radioactive isotopes for the development of any atomic weapon.

"There are also other prohibitions along the same line. The paragraphs which I have just read from this chapter are part of the United Nations plan of control, which plan was approved by the General Assembly and for which plan the United States voted in favor. It thereby gave its agreement to this explicit plan for the prohibition of atomic weapons.

"The question I want to ask the representative of the USSR is: Has he suggestions to make for enlarging or strengthening this statement of prohibition, and in what respect does he find it inadequate, recognizing that this is not a treaty, but the outline for a treaty? In what respect does he find it inadequate?

"How does he want to strengthen this agreement on prohibition which the United States has affirmed and consented to and which 46 nations, by their votes in the General Assembly or in the First Committee of the General Assembly, have confirmed and assented to? That is my first question to the rep-

resentatives of the USSR and the Ukrainian SSR on prohibition.

### Control

"My second question is in regard to control. The verbatim record of the Working Committee on 3 June 1949 shows that the representative of the USSR said:

> . . . USSR proposals are based on the fact that the peoples of every country would act in good faith and would allow no violation of the conventions on the prohibition and control of atomic energy. . . . We are convinced of the validity of our position, namely, that the international prohibition of the use of atomic weapons . . . would ensure the elimination of the threat of the use of the atomic weapon and would eliminate the threat and danger of mass destruction. . . .

"My question as regards this matter is this: Does the representative of the Soviet Union mean by this that control is not necessary, that he would trust the peoples of the world, as he said—and therefore, by implication, their governments who are the only ones who can speak for the peoples of the world—to enforce a simple treaty of prohibition without the controls which would make the enforcement more certain? That is my question on controls.

"Is he attempting to say, as he appears to say in this speech, that a treaty on prohibition would be satisfactory to the USSR, without controls?

### Stages

"Regarding stages, may I again refer to the plan for the control of atomic energy and the prohibition of atomic weapons (Document AEC/C.1/77 Rev. 1. Chap. 11, p. 55):

> The treaty or convention should embrace the entire programme for putting the international system of control and inspection into effect, and should provide a schedule for the completion of the transitional process over a period of time, step by step, in an orderly and agreed sequence leading to the full and effective establishment of international control of atomic energy. In order that the transition may be accomplished as rapidly as possible and with safety and equity to all, this Commission should supervise the transitional process, as prescribed in the treaty or convention, and should be empowered to determine when a particular stage or stages have been completed and subsequent ones are to commence.

"This is the statement on stages contained in the United Nations plan; it is the only statement on stages contained in the United Nations plan. The question I want to ask of the Soviet Union is not the same question as was asked by the representative of France, namely; Did not the Soviet Union, in the person of their representative, Mr. Gromyko, at one time agree to this statement of stages?

"I am not at this time concerned with that question, but I want to ask, where, in the United Nations plan, which is the full statement of the position of the United States as well as of forty-six other nations, do they find the fantastic statements about stages which they attribute to the United States?

"If they will take this plan and mark it in the places which they believe give the extraordinary interpretation of stages which they have been putting out to their people over the radio and in the press as being contained in the United Nations plan, and if they will mark in this plan where those fantastic statements are to be found, we may then go over them and see whether there is, in fact, any place in this plan where anything is said about stages, except in this paragraph, that is pertinent to this discussion.

"Perhaps we can then find that I am mistaken, that there is something in the plan which defines stages, or we may find that the representatives of the Soviet Union and the Ukrainian SSR are mistaken, and that there is nothing there in effect, that it is due to a misunderstanding of something they have read or read carelessly. That is my question on stages: Where in the plan have they found anything more than this statement?

"I wish that the representative of the Soviet Union would consider these three questions. I do not expect an answer from him today; I should not want an unconsidered answer because we are now getting into the meat of this debate. Let us have a real discussion of what this United Nations plan is, this plan which has been approved. Why are these extraordinary and fantastic misunderstandings possible? Can we clear up these misunderstandings and at least agree on what the plan means?

"As I said, I am not asking that the representative of the Soviet Union answer these questions today. I am asking that he consider them and that he prepare a careful answer, from which answer I and others will again try to make a careful reply. We may then be able to figure out why there is this extraordinary discrepancy in our various interpretations of the United Nations plan of control."

## MR. MALIK'S QUESTIONS

Mr. Malik replied that he would answer these questions when Mr. Osborn had answered the following questions.

1. "Is the delegation of the United States ready to agree to the immediate prohibition of atomic weapons and the immediate elaboration, conclusion, and implementation of the appropriate convention on prohibition?

2. "Is the delegation of the United States ready to agree, simultaneously with the prohibition of the atomic weapons, to the simultaneous establishment of strict international control over all facilities for the extraction of atomic raw materials, and the production of atomic materials and atomic energy, beginning with the mining of the ore and including facilities for the production of finished atomic materials?

3. "Is the United States delegation ready to abandon its basic thesis that the 'international control organ' which it proposed, and which cannot be called anything but a world atomic supertrust under the monopoly control of the United States, must be the owner in the various countries of the mines, raw materials, and the whole production of atomic materials and atomic energy, and is it ready to agree to the establishment of a real international control organ within the framework of the Security Council which would exercise strict and effective control over atomic energy facilities on the basis of a convention on prohibition?"

## MR. OSBORN'S REPLY

The Committee was expected to vote on June 9, but Tarasenko asked for another delay. At this meeting Mr. Osborn made the following reply to Mr. Malik's questions:

"My answer to the first question is as follows. The delegation of the United States is not willing that the prohibition of atomic weapons should go into effect prior to the going into effect of a system of control. The delegation of the United States is not willing to accept any plan under which nations acting in good faith were to destroy their atomic weapons before effective control had been established and put into effect by an international agency for the purpose of seeing that all other nations had also destroyed their atomic weapons. The United States stands by the plan

of control and prohibition approved by the General Assembly on 4 November, 1948.

"The answer of the United States to the second question is as follows: The United States agrees to control by an international agency over all stages of production, from the mines to the production of the finished product, as provided in the recommendations of the United Nations Atomic Energy Commission which were approved by the General Assembly.

"These recommendations do not propose the order in which controls would be put into effect. They do not propose that mines be controlled first, or that nuclear fuel plants should be controlled first, or that all controls should be put into effect simultaneously.

"The plan approved by the General Assembly simply states that the treaty which covers both prohibition and control should provide 'a schedule for the completion of the transitional process over a period of time, step by step in an orderly and agreed sequence, leading to the full and effective establishment of international control of atomic energy.'

"The Atomic Energy Commission, in its Third Report to the Security Council, stated that 'until agreement on the basic principles of control has been reached, the elaboration of programmes to cover these remaining topics would be unrealistic and would serve no useful purposes.' The words 'these remaining topics' include stages.

"The United States is wholly in accord with these conclusions of the Third Report and, accordingly, has never taken a position on the order of the various stages. If there is any misunderstanding on this matter the Soviet Union delegation should point out the paragraphs of the approved plan from which he draws other conclusions.

"The United States has never proposed that mines be controlled first, or that nuclear fuel plants be controlled first, or that the full controls be put into effect simultaneously or not be put into effect simultaneously. Indeed, it must be evident that a very elaborate system of stages would be necessary in order to put all the elements of control into effect simultaneously in all countries and over all stages of production without injustice.

"The United States insists that controls be of a nature which will assure effective enforcement of prohibition. As soon as agreement has been reached on such control it would desire to negotiate stages in the Atomic Energy Commission.

"It must be evident from the foregoing that the United States is opposed to any system which would provide for prohibition going into effect before the corresponding controls went into effect.

"Now I shall answer what Mr. Malik calls his third question; but only part of it is a question, and the other part of it consists of unilateral statements of Mr. Malik, which the Soviet Union delegation has been making for the past three years.

"The first such statement refers to the international control organ—in the language of this revised question, 'international control organ which it [meaning the United States] proposed.' It is true that at the first meeting of the Atomic Energy Commission the representative of the United States proposed that there should be an international control organ. But, at the same time, the representative of the Soviet Union also proposed that there should be an international control organ.

"If the representative of the Soviet Union is now referring to the control organ proposed in the recommendations of the Atomic Energy Commission, which were approved by the General Assembly on 4 November, 1948, then he should read the statements made by the representatives of Syria, Australia, Canada, France and the United Kingdom in the meetings of the General Assembly in Paris in 1948, in which

they stated vigorously that their own delegations had taken a very active part and made important contributions in the preparation of the recommendations.

"The second statement contained in Mr. Malik's question is that this international control organ 'cannot be called anything but an atomic supertrust which would be under the control of the United States.'

"We do not see how it would be possible to place such an interpretation upon the general principles covering the international organ developed in the First Report of the Commission. But such an interpretation is imposed even more in the case of the Second Report of the Commission when these general principles were reduced to specific proposals and the majority of the Commission followed the line of reducing the power of the international organ by placing in the treaty itself all the rights of nations, and particularly the quotas to be assigned to nations for peaceful purposes.

"The recommendations approved by the General Assembly, therefore, do not provide for any super-trust, as implied by Mr. Malik. As to whether the international organ would be under the control of the United States, which has one vote in the Commission while the ten other members also have one vote each, that is a matter on which Mr. Malik is entitled to his own opinion.

"It has been the experience of my nation over a long period of international co-operation that in the long run control is exercised by moral leadership and not by physical force. If that is the kind of control which Mr. Malik has in mind, I can only hope that the United States, and all the other nations members of the Atomic Energy Commission, will prove worthy of such leadership.

"Having eliminated those parts of Mr. Malik's third question which are statements and not questions, I do not need to read the remainder of the paragraph, since it is before the Committee. I have the old question here. If Mr. Malik means, by the words 'conventions for the implementation of control,' the inadequate measures proposed by the Soviet Union, my answer is, of course, no; neither the United States nor other nations can accept such a system of control. The refusal of such a system by the great majority of nations was clearly indicated by the voting in the General Assembly.

"If the representative of the Soviet Union means a system of control in which atomic activity of all sorts, including the production of nuclear fuels, while the material of explosives remains in national hands, then my answer is that such a system would never remove the fear and distrust which constitute a threat to the peace, and the United States would not accept such a system.

"The United States stands by the recommendations of the Atomic Energy Commission which have been approved by the General Assembly and for which the United States voted in the affirmative, which recommendations provide that the international control organ should hold all atomic source materials, nuclear fuel, and dangerous facilities in trust for the participating nations and be responsible for ensuring that the provisions of the treaty in regard to their disposition are studied and that

nations cannot have any proprietory rights or rights of decision arising therefrom over atomic sources and atomic materials located within their territories.

"The United States delegation is not willing to give its approval of these recommendations approved by the General Assembly on 4 November, 1948, which provided that the agency shall have the exclusive right to own, operate, and manage all dangerous atomic facilities. The approved recommendations do not provide for the ownership of mines by the international control organ except in very special cases. Nor has the United States ever proposed that the international control organ should own mines. That the question of the representative of the Soviet Union includes a statement about mines would again indicate that he is under some misapprehension as to the recommendations approved by the General Assembly on 4 November and, hence, as to the position of the United States.

"There is, finally, a new question which the representative of the Soviet Union has now included in his third question. This reads:

> And is it . . . [that is, the United States] ready to agree to the establishment of a real international control organ within the framework of the Security Council which would exercise strict and effective control over atomic energy facilities on the basis of a convention of prohibition?

"The answer to this question is that the basis for such a convention of prohibition and control has been approved by the General Assembly—on 4 November, 1948—and the United States has given its adherence to that plan by its affirmative vote, and stands by its adherence to that plan.

"These are the answers to the three questions put to me on 7 June and repeated in somewhat altered form by the representative of the Soviet Union today. I hope very much and very sincerely that I have answered them in such a way as to clarify the position of the United States in the mind of the Soviet Union representative and also in such a way as to clear up certain misapprehensions in regard to the actual content of the recommendations approved by the General Assembly.

"I hope now that the representative of the Soviet Union, after due consultation with his Government, about which he spoke, will be able to answer my questions in the same spirit."

## MR. TSARAPKIN'S SPEECH, JUNE 15

On June 15, Semyon K. Tsarapkin, Soviet Union, spoke to the Working Committee on behalf of Mr. Malik. He said that Mr. Osborn's answers "cannot be considered as satisfactory," and that they were formulated so as to confuse the situation rather than to clarify it.

"The United States, in point of fact, does not wish to have a convention for the prohibition of atomic weapons, nor does it wish for a strict and fair control over atomic energy. In view of this position, the United States has been successful in having the Atomic Energy Commission and the General Assembly accept their fantastic expansionist plan of control.

"The United States has done nothing to arrive at an agreed decision in respect of prohibition and the establishment of strict and effective control.

"The United States continues to ignore the resolutions of the General Assembly of 24 January and 14 December, 1946, which determine as the first task the prohibition of atomic weapons and the establishment of a strict control over atomic energy.

"The United States maintains a position at the basis of which is a policy of dictatorship and it is therefore not possible to arrive at an agreed solution. Such a position can only be explained by the fact that the United States appears to have as its aim an attempt to undermine, in any circumstances, the decision of the General Assembly to which I have referred.

"I can only add a reference to the Second Report of the Atomic Energy Commission, chapter 10, paragraph (a), concerning the prohibition of atomic weapons which is of a declaratory character. This reference does not include delays, deadlines, or concrete proposals in respect of the prohibition of atomic weapons. Therefore, this reference cannot be either strengthened or improved. Discussion of atomic weapons around this reference will mean marking time or remaining on one spot and will not bring about a solution of the problem of the prohibition of atomic weapons and the establishment of control of atomic energy.

"Such task is still before us and we have no right to circumvent it. To find a solution is our duty, our obligation.

"In view of this, the delegation of the Soviet Union proposes that all states of the world should agree to proclaim the outlawing of atomic weapons, to prohibit their production or stockpiling, and to destroy existing stockpiles.

"These proposals are concrete and provide an answer to the yearnings and the interests of humanity as a whole and the populations of every country.

"In his second question the representative of the United States asks whether the Soviet Union considers that it is sufficient to conclude an agreement for the prohibition of atomic weapons, not establishing any control. This question is really uncalled for; it is a gratuitous question. The author wishes to mix the cards and to confuse the position of the Soviet Union in respect to this question and to present it in a wrong light.

"The representative of the United States really did not have to make such an effort to formulate this question inasmuch as the answer can be found in a draft convention for the control of atomic energy submitted by the representative of the Soviet Union on 11 June, 1947, and in the draft resolution submitted by the representative of the Soviet Union on 25 February, 1948.

"The first paragraph of this draft resolution states:

> . . . immediately proceed to the elaboration of a draft convention for the prohibition of atomic weapons and a draft convention for control over atomic energy; the two conventions to be concluded and put into effect simultaneously.

"In its draft resolution concerning control the Soviet Union proposed that the international control organ should proceed with a strict inspection of plants extracting atomic raw materials and producing nuclear fuel. In this inspection the control organ should check the activities of these plants, should check the unfinished products, the stockpiles, the operations within a scope necessary for control over the utilization of atomic materials, the technical exploitation of the plants, the production of atomic materials and atomic energy, and should proceed with special research into cases of suspicion of violation of the convention for the prohibition of atomic weapons.

"This control organ should also formulate recommendations to governments with respect to questions of production, stockpiling, utilization of materials, and should make recommendations to the Security Council for measures of prevention of violation of the convention on the prohibition of atomic weapons and control of atomic energy.

"In accordance with the proposal of the Soviet Union, the organ created to implement the task of control and inspection should have the right of access

to any plant extracting or producing atomic materials or nuclear fuel, and in respect to exploitation of atomic energy it should have the right to acquaint itself with processes of production, weighing and analysis, and the right to require from any government the privilege of checking and verifying all types of information and reports concerning the production in these plants.

"It should also have the right to require explanations in respect of questions pertaining to the activities of these plants producing atomic energy and the right to make recommendations to States concerning the utilization of atomic energy, in addition to the right to formulate recommendations to the Security Council on measures to be taken against violators of the conventions on prohibition and control.

"These are the proposals of the Soviet Union, which ensure the implementation of strict and effective control of atomic energy and the achievement of a convention on prohibition of atomic weapons.

"I think that now the representative of the United States will see clearly that the position of the Soviet Union with respect to control is not as he attempts to present it when he asks whether the Soviet Union considers it sufficient simply to conclude an agreement on the prohibition of atomic weapons without establishing any control at all over atomic energy.

"From what I have just read, it is quite clear that the Soviet Union continues to hold that it is necessary to establish strict and effective control of atomic energy and to prohibit atomic weapons.

"I do not wish to dwell on these questions at greater length, since the position of the Soviet Union is clearly indicated in the documents to which I have referred and since the representatives of the Soviet Union have made the position clear in the various bodies which have discussed that question—the Security Council, the General Assembly, the Atomic Energy Commission, and its Working Committee.

"The Soviet Union is in favor of the prohibition of atomic weapons and the simultaneous establishment of strict control over atomic energy.

"As to the third question of the representative of the United States in respect to stages of control, I gave an answer to that question earlier when I made an appraisal of the answers given by the representative of the United States to the question put to him by the representative of the Soviet Union."

The Working Committee then approved the Chinese proposal to abandon debate on Soviet proposal. The vote was 7 to 2, with the Soviet Union and the Soviet Ukraine against, and Egypt and Argentina abstaining.

## UNAEC WORK SUSPENDED

The Committee then voted 8 to 2 (Egypt now abstaining) on the Cuban-Argentine proposal to suspend further study on the atomic problem in the Working Committee until the six sponsoring powers — the United States, Great Britain, Russia, France, China and Canada—consult and report that a basis for agreement exists.

On July 20, at a meeting of the Commission, Mr. Osborn submitted a resolution expressing the same intent as the Cuban-Argentine Proposal. This resolution was attacked by the Soviet Union and the Soviet Ukraine when the Commission met again July 29. But it was passed by a final vote of 9 to 2.

Although the majority remained nine members, there were some who did not go along on the whole resolution when it was voted on by sections. The Osborn resolution and the vote by sections on July 29 follows:

### Draft Resolution Submitted by U. S. Representative July 20, 1949

The Atomic Energy Commission reports:

That in accordance with the instructions in the General Assembly resolution 191 (III) of 4 November 1948, the Atomic Energy Commission has surveyed its programme of work in order to determine whether further work would be practicable and useful, (Approved, 9 to 2 [U.S.S.R. and Soviet Ukraine])

That the Union of Soviet Socialist Republics and the Ukrainian SSR continue to reject the recommendations of the Commission approved by the General Assembly on 4 November 1948, including those forms of control contained in the plan approved by the General Assembly as constituting the necessary basis for establishing an effective system of international control of atomic energy to insure its use only for peaceful purposes and for the elimination from national armaments of atomic weapons in accordance with the terms of reference of the Atomic Energy Commission; (Approved 8 to 2 with Argentine abstaining)

That the Union of Soviet Socialist Republics and the Ukrainian SSR continue to insist on the adoption of the draft resolution proposed by the Union of Soviet Socialist Republics and rejected by the General Assembly on 4 November 1948, to prepare immediately separate conventions based on the proposals of the Soviet Union of June 1946 and June 1947, which provide among other things for national ownership of dangerous and explosive atomic materials, and for national ownership, operation and management of dangerous atomic facilities. (Approved 8 to 2 (USSR and Ukraine) with Argentina abstaining)

This in the opinion of the majority of the Commission would not remove causes for suspicion, fear and distrust among nations, would render ineffective the prohibition of atomic weapons, and would continue dangerous national rivalries in the field of atomic energy. (Approved 6 to 2 with 3 abstentions. The U. S., United Kingdom, China, Cuba, Norway, and Canada voted for this section; USSR and Ukraine voted against it, and Argentina, Egypt and France abstained.)

*Concludes:*

That the impasse as analyzed in the Third Report of the Atomic Energy Commission still exists; that these differences are irreconcilable at the Commission level, and that further discussion in the Atomic Energy Commission would tend to harden these differences and would serve no practicable or useful purpose until such time as the Sponsoring Powers have reported that there exists a basis for agreement. (Approved 9 to 2 [USSR and Ukraine])

The United States resolution approved by the Commission was a substitute for a Cuban-Argentine proposal approved by the Working Committee on June 15, 1949. No action was taken on the Cuban-Argentine proposal.

Before acting on the American resolution, the Commission approved a resolution saying no useful purpose can be served by further discussions in the commission of the Soviet proposals.

The vote was 7 in favor, 2 against (USSR and Ukraine) and two abstentions (Argentina and Egypt).

The Working Committee had approved this resolution, originally presented by China on June 15. (See page 256 above.)

The Commission adjourned with a statement by Dr. Wei that he hoped that the suspension would be only temporary. He said the resolution adopted July 29 would be transmitted to the Security Council and the General Assembly.

# TO OUR READERS

In the June-July issue of the BULLETIN, a statement by the Emergency Committee of Atomic Scientists (ECAS) was published, announcing the cessation of its activities, and calling for continued support of the BULLETIN by former contributors to the ECAS. The generous response which this appeal has received has strengthened our belief that the BULLETIN still fulfils a useful function.

Direct political action of scientists, such as was undertaken on behalf of civilian control of atomic energy three years ago, may not be possible at the present time, at least until a new situation calling for such action should arise; but the task of PUBLIC EDUCATION in the field of atomic energy, and, more generally, of the social and political implications of modern science, remains as urgent as ever. The need for an OPEN FORUM for the discussions of these implications by natural and social scientists remains vital. Scientists interested in public affairs need, more than ever, an organ which will bring them reports on national and international developments relevant to their problems. These are the three tasks to which the BULLETIN is devoted. Their increasing importance justifies our intention to continue the BULLETIN as a permanent magazine of education, discussion, and information on science and public affairs.

Scientists associated with the atomic bomb project during the war were the first and most active group to take part in public affairs after the war, and they still constitute the "hard core" of all such activities. Atomic energy remains the best example of how public policy in the present age has become intimately connected with the advance of science. Nevertheless, as time goes on, atomic scientists become but a part of the growing community of American scientists who recognize their obligation to take part in the formation of national and international policies as they affect and are affected by development in various fields of science.

Without changing its name or direction, the BULLETIN has given increasing recognition to this extension of interest. During the last twelve months, we have published articles and symposia on such questions as the National Science legislation, the moral responsibilities of scientists, the planning of scientific research, and the conflict of science and political dogma in the Soviet Union.

While aspiring to remain the most authoritative and complete source of information on general aspects of atomic energy—an achievement which has been widely recognized by the public in the four years of the BULLETIN'S existence—we intend in future to do increasing justice to other questions of science in its relation to society.

A year ago the cessation of financial support by the ECAS placed before the BULLETIN the problem of supporting itself without sacrificing its standards. Those familiar with the difficulties of publishing a magazine of limited circulation with an intellectual rather than emotional appeal, told us that we could not survive. We did—thanks to our subscribers and our many faithful friends and supporters. We need their continued support to keep the BULLETIN on a steady keel. We need our subscribers—who have demonstrated their appreciation by a remarkably high rate of renewal, almost without reminder on our side—to keep faith with us, despite the increase in the subscription rate to five dollars, which the hard facts of our existence have now made unavoidable. We believe that what they receive twelve times a year is worth the price of dinner for two.

Many scientists appreciate the BULLETIN, but are satisfied with reading it regularly in the library. We urge them to become subscribers. It is their magazine; they ought to carry their small share of this effort of the American scientific community to give science its voice in public affairs.

Many more people than are now reading the BULLETIN would enjoy and benefit by it if they knew of its existence and were familiar with its contents. But promotion requires more money than we have. We rely on our subscribers as promoters. Each one who brings in a friend or colleague as a new subscriber, helps us not only to maintain the BULLETIN on its present high journalistic level, but to make its content richer. He will have contributed his share to a task to which we have devoted much time and energy—to acquaint Americans with the challenge of the "atomic age," so that they may lead mankind to the benefits which science can promise a free and rational world.

*—The Editors*

# *They Still Need to Know You CARE...*

IN MANY COUNTRIES TODAY there are children without enough to eat, without adequate clothing. There are thousands of men and women whose will to work and help rebuild their countries is weakened by stringent diets, by years of shortages of life's necessities. Through the Economic Cooperation Administration, our government is sending money abroad, to reconstruct fundamental economies. But reconstruction takes time. The people in those countries—the men, women and children—need individual, person-to-person help right now!

How the faces of the people abroad light up, when CARE packages from America arrive. CARE brings food, brings clothing textiles, brings other basic supplies. No one can get CARE packages, however, unless YOU give them! You can send CARE packages to friends and relatives overseas. You can send them to needy strangers, to institutions like orphanages and hospitals, to be selected by representatives of CARE's 26 member welfare agencies. Or you can send a donation in any amount, to be pooled in CARE's general-relief fund.

CARE (Cooperative for American Remittances to Europe, Inc.) is a non-profit, government-approved agency. CARE assembles its standard packages, transports them abroad and guarantees delivery, all at one flat fee—$10 each for most of the CARE parcels. Because CARE is non-profit, because it buys and ships in bulk, CARE can send the most for your money. Package contents are selected to meet definite needs in each CARE country. Just mail your order, or your donation—CARE does all the rest!

Deliveries Guaranteed to:

Austria, Belgium, Czechoslovakia, Finland, France, the Western zones of Germany and all Berlin, Great Britain, Greece, Italy, the Netherlands, Norway, Poland, and Japan, Okinawa, and Korea.

Package Varieties Include:

$10 each—Standard food; British, Italian, Greek, Japanese, kosher food; baby food; baby layette; household linens; wool suiting; knitting wool. Also, wool blankets, $7.75; 10 pounds of lard, $4.75.

**CARE . . . . 20 Broad St., New York 4, N. Y.**

thing.
ngent
ent is
those

food,
hem!
tions
u can

ency.
each
l the
your

Y.